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Design of Open Hearth Furnaces

Arrangement of Ports for Different Fuels, Variation in Areas and the Matter of the Furnace Roof

— BY A. D. WILLIAMS —

A NUMBER of different arrangements of the ports of the Siemens furnace have been devised and used with more or less success. The early Siemens furnaces were designed for the use of producer gas, which required preheating; later these furnaces were used with various manufactured and natural gases and fuel oils, while latterly pulverized coal has been employed. These various fuels require furnace modifications, mainly in the ports and heads, as only the air supply is pre-heated.

Pulverized coal is only suited for use in furnaces where the ash carried into the furnace with the fuel will not be objectionable. One trouble with early open-hearth or Siemens furnaces was the dirt carried over into the regenerators. This was particularly the case when the chambers were located immediately below the furnace and the uptakes rose directly from the chamber arch. In later designs the chambers were placed below the charging platform and the uptakes were carried up from a cinder pocket or slag chamber. This reduced, but did not eliminate, the cinder trouble.

The carrying power of a flowing stream varies as the sixth power of its velocity. That is, when the velocity is doubled, the mass of the particles which the stream can carry increases 64 times. The inertia of these larger particles tends to carry them into any eddies where the stream changes direction, but the finer particles will be carried further. The ports must be inclined and the velocity of the flame must be sufficient to enable the making of the bottom. This also tends to direct the flame on the surface of the bath, and the higher the impinging velocity the greater the tendency to pick up cinder, etc., which will be thrown up during the boil.

Possibly the best illustration of the action of the jet of flame impinging upon the top of the bath may be obtained by observing the action of a stream of water from a nozzle impinging upon a flat plate. When di-

rected at right angles to the plate there will be a circular flare or film of water traveling outward at a high velocity and a short distance out a tumultuous ring of eddying water eight or ten times as thick as the film it surrounds. The distance out to this ring will depend upon the velocity of the stream.

When the jet strikes the plate at an angle it will form a triangular high velocity film breaking up into a turbulent eddy at the base or side farthest from the apex where the stream strikes the plate. The distance from the stream to the eddy will be affected by two factors: the velocity of the stream and its angle of incidence. If for the flat plate a water surface is substituted the action is complicated by the fact that the jet displaces a certain amount of the surface water and the size of the turbulent eddy is considerably increased.

If a second stream of water be directed so that it impinges upon the first stream just before the first stream impinges on the plate, the condition of the formation of the flame in the furnace will be approximated.

The main difference between the

action of the two streams of water and that of the streams of air and gas forming the flame will result from the fact that as the reaction of combustion takes place there is a great increase of temperature, which approximately makes the volume of the flame double that of the reacting gases.

A study of the effect of the velocities of the two streams upon their mixing will reveal many interesting facts, particularly if the streams are colored so as to supply a contrast and a third color by the complete mixture. The degree of the mixing at various points will be revealed by the various tints formed as one or the other color predominates.

The function of the ports is to bring the combustible and the comburent to a point where they will combine in the flame. In the early types of Siemens furnaces there were usually five ports side by side, two for gas and three for air. Figs. 9, 10 and 11 show later designs of ports which were used respectively with the heating

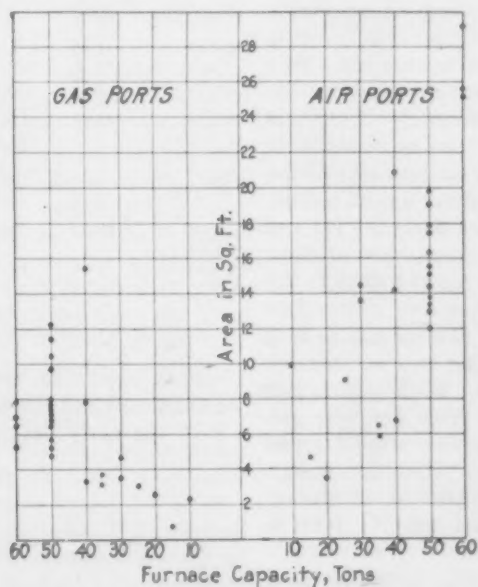


Fig. 8.—Diagram Showing Port Areas of a Number of Open-Hearth Furnaces

*Copyrighted 1920, by A. D. Williams. The first article, printed in the issue of Jan. 1, discussed the lack of rationale in existing furnace design; the second, given in the issue of Jan. 8, took up the flow of gases within the furnace.

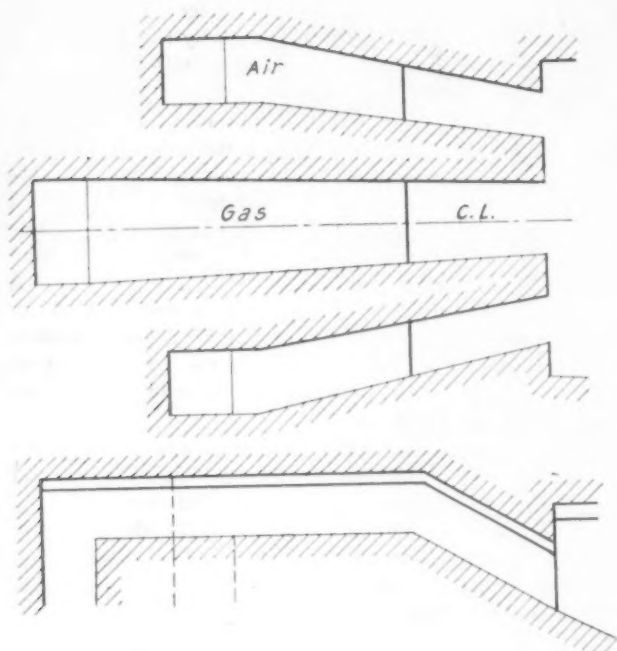


Fig. 9.—Arrangement of Ports of a 25-Ton Furnace, at Lissva, Russia

chambers shown in Figs. 13, 14 and 15. Figs. 9 and 13 were used at the Lissva Works (Oural), Russia, while Figs. 10 and 14 and 11 and 15 were used in American furnaces, the last being the later design. A noticeable feature of the Russian furnace is that the bath occupies about 0.60 of the length of the heating chamber. This gives a space at each end of the heating chamber for the formation of the flame. The velocities of the gas and air entering the heating chamber are approximately the same. The air ports are located on each side of the gas port. This furnace works hot and has a good output.

The ports shown in Fig. 10 were designed for use with natural gas, which was jetted into the port at right angles with the stream of preheated air and close to the bottom of the port. These ports were also intended to permit the use of producer gas in case of the failure of the natural gas supply, there being two regenerator chambers at each end of the furnace. With natural gas both chambers were used for air. With producer gas the uptakes nearest the heating chamber were for gas and those further back were for air. With this design of port the stream of gas impinges upon the air stream counter to the current. This would tend to form a mixing eddy at the point of junction.

The port arrangement shown in Fig. 11 is that used in many American furnaces. In this design the air velocity is comparatively low, while the gas velocity is from four to ten times the air velocity. One of the reasons that has been advanced for this port arrangement is that it forms a blanket of air between the flame and the roof, reduces the wear on the roof and protects the bath from the oxidizing effect of the air. This design of port gives an extremely long flame. The flame is forced away from the port and the ends of the heating chamber work alternately hot and cold. The introduction of this design of port resulted in an increase in the length of the heating chamber in order to prevent the flame passing beyond the heating chamber. Then the gas velocity was increased to force the flame to the end of the chamber.

Fig. 8 is a diagram in which have been plotted the areas of the gas and air ports as tabulated in Table VII. The wide difference in the ideas of port areas is well illustrated.

With oil, pulverized coal, coke oven and natural gas the fuel is piped to the furnace and used without preheating. The fuel is introduced at the end bulkhead or

through the sides of the heads. Blue water gas has been used in some foreign furnaces. As this gas contains practically no hydrocarbons it may be preheated. A few attempts have been made to utilize blast furnace gas in the open hearth. It may be done by preheating to a higher temperature than is usual with the ordinary mixed producer gas. Regardless of whether the fuel is used cold or preheated it must be brought into contact with the preheated air so that the flame formed will permit the sintering of the bottom, and the heads of the furnace must be designed to obtain this result.

One of the reasons blue water gas and blast furnace gas have not been considered on their heating possibilities is the fact that they burn with a non-luminous flame. It being considered that to obtain high temperatures in the open-hearth and reverberatory furnace a flame with a so-called high radiating effect is necessary. By this is meant a luminous flame. It is well known that the transmission of heat by radiation varies as the difference between the fourth powers of the temperatures of the radiating and recipient surfaces and a coefficient varying from unity for the ideal black body to a very small fraction of unity for a polished surface. Conduction varies with the temperature difference. Convection

Table VII—Areas of Air and Gas

Reference Number	Port areas, sq. ft.		Reference Number	Port areas, sq. ft.	
	Gas	Air		Gas	Air
10-01-A	2.43	10.12	50-04-A	10.50	18.0
15-03-B	1.07	4.68	50-05-A	7.66	19.2
20-03-A	2.80	3.50	50-07-A	5.75	13.8
25-04-A	3.25	9.00	50-09-A	7.50	13.7
30-04-A	4.75	13.75	50-10-A	6.60	13.1
30-05-A	3.70	14.60	50-11-A	4.92	14.53
35-01-A	3.4	6.40	50-12-A	11.59	17.72
35-01a-A	3.75	5.98	50-13-A	12.50	18.0
40-05-A	15.70	21.00	50-14-A	6.80	15.38
40-06-A	3.5	7.00	50-15-A	9.85	16.14
40-04-A	8.00	14.25	50-16-A	5.62	17.80
			50-16a-A	7.00	20.00
			50-17-A	10.50	12.33
			50-18-A	8.00	16.42
			50-19-A	7.40	13.30
			60-05-A	6.75	29.31
			60-06-A	8.00	25.74
			60-13-A	7.74	25.37

depends upon the temperature head or difference in temperature and the flow of the fluid.

In the early designs of Siemens furnaces the roof

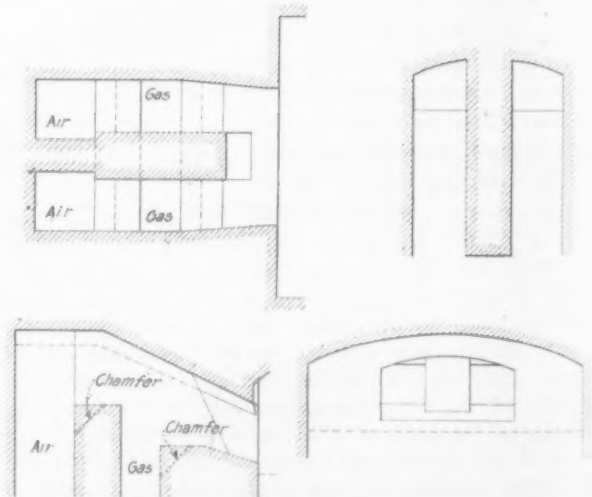


Fig. 10.—Arrangement of Ports, 50-Ton Furnace at Homestead. This furnace was fired with natural gas but was arranged for producer gas firing

was depressed from each end to the center as shown in Fig. 12. It was supposed that this type of roof enhanced the heating effect by forcing the flame into contact with the bath and assisted in the sintering of the bottom. This type of roof had a short life, as it had a

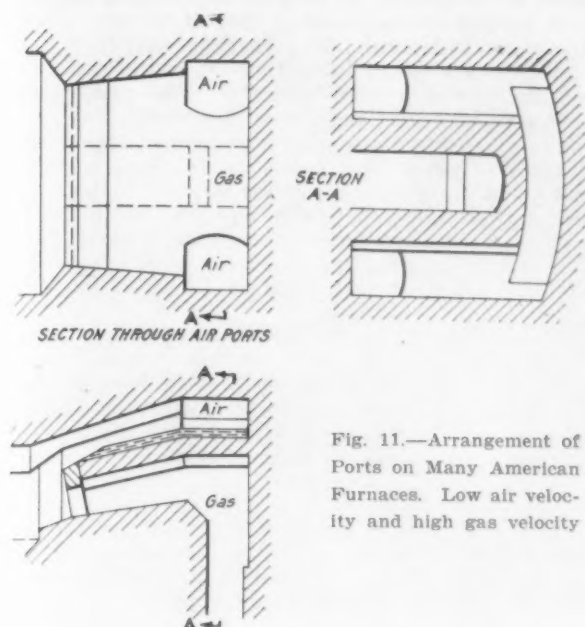


Fig. 11.—Arrangement of Ports on Many American Furnaces. Low air velocity and high gas velocity

tendency to burn out and in addition it was frequently damaged when charging the furnace. Its worst defect was that it choked the furnace. Later designers were bit by the radiant heat bug and this resulted in the forms of roof shown in Figs. 13 and 14. It was soon found, however, that this type of roof resulted in an increased fuel consumption and the straight roof, Fig. 15, is now used.

Fig. 16 shows a form of skewback designed to prevent the wall expansion from interfering with the roof. Twelve-inch roofs are widely used and many American furnaces employ the Orth roof, which permits the use of a repair block when the intermediate shapes burn out. It is possible that a roof with cooling ribs spaced closer together than in the Orth roof would be more satisfactory.

It is a basic principle of furnace design that satisfactory results cannot be obtained unless the flame licks the sole of the furnace. It is likewise well known that bottom cannot be made in an open-hearth furnace unless the flame can drop down far enough to cinder the bottom in place, no matter how luminous the flame may be. One of the hottest flames is that of the oxy-acetylene torch. Acetylene burned in air gives a very luminous flame, but when this flame is supplied with oxygen it becomes a blue non-luminous flame. The luminous acetylene flame does not emit an excessive amount of radiant heat to any recipient surface. It is rather noticeable that when the oxy-acetylene torch is used in welding it is necessary for the flame to impinge upon the work, and that the work has a tendency to become luminous, while the flame itself has a very slight luminosity, and that at the tip only. The mixer producer gas which is used in numerous Siemens furnaces derives its heating value mainly from carbon monoxide and hydrogen. These two combustibles are the main constituents of blue water gas. In fact, blue water gas bears a fairly close resemblance to a good mixed producer gas from which the nitrogen has been removed.

Radiant heat from a luminous flame may also be considered from another viewpoint. The roof, side walls and bath are at a high temperature and emit a certain amount of light, depending upon their temperature and emissivity. The flame is sufficiently transparent, when the furnace is at a high temperature, to permit of the opposite wall and the slag surface being seen. The red and yellow portion of the flame, which emits the most visible light, is not transparent and is at a lower temperature than the blue transparent portion. A

smoky flame is caused by the presence of soot, or unignited carbon. Soot may be caused by the dissociation of carbon monoxide when this gas is chilled by impinging upon cold metal.

Stratification is frequently observed in the flame. Cool gases tend to collect below hotter gases. The hottest gases tend to rise to the roof, where they are cooled. The coldest gases would have a tendency to collect on the surface of the bath, but the jet of flame from the ports tends to sweep them away. Convective currents are rarely appreciated at their true value. A temperature difference of 1 deg. C. is sufficient to impress a velocity of 0.268 meters (0.88 ft.) per second, and this velocity will increase as the square root of the difference in temperature. This tends to give an angular direction to currents.

The open-hearth furnace works very close to the yield point of the refractories, but it is only recently that water cooling has been adopted for these furnaces, although it has been used for years in the blast furnace. Water cooling adds to the life of the brickwork by increasing the thermal gradient through the wall and removing the heat. It adds little if anything to the



Fig. 12.—Dropped Roof of Early Furnace Design

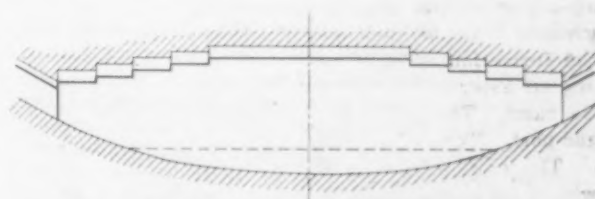


Fig. 13.—Heating Chamber with Raised Roof

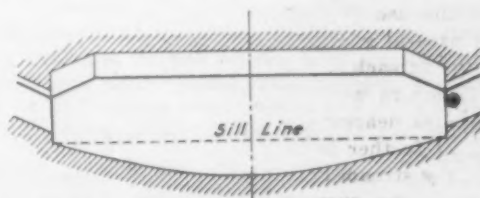


Fig. 14.—Heating Chamber with Raised Straight Roof

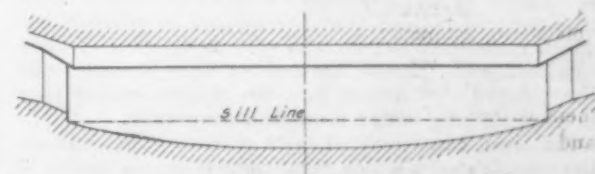


Fig. 15.—Heating Chamber with Straight Roof

fuel consumption and increases the life of certain portions of the furnace, thereby reducing the amount of time the furnace is down for local repairs, and this means increasing the output. Water cooled doors and frames were used a number of years ago, but the extended use of cooling devices is rather recent.

In early designs of furnaces the regenerator chambers were under the furnace and the uptakes rose direct to the ports. As a result the upper portion of the checker work blocked up rapidly and its life was reduced. The first cinder pockets were small chambers parallel with the regenerator chamber designed to distribute the gases to the checker work by a number of

small ports, and their functioning as cinder pockets was accidental. The way the cinder lodged in them showed the advantage of increasing their size and ample space for this purpose became available when the checker-

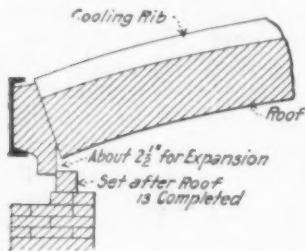


Fig. 16.—Skewback Construction, Designed to Permit Wall to Expand at Top

work was removed from below the furnace and placed under the charging platform. The main fault with many of these pockets is their lack of depth. Removable cinder pockets have been devised.

(To be continued)

CEMENT COATED NAILS

Resinous Mixture Used to Give Marked Holding Power—History of Manufacture

BY H. A. KNIGHT

Approximately one-tenth of the wire nails manufactured are cement coated, according to R. L. Foster, president J. C. Pearson Co., Inc., Boston, the largest producers of coated nails in the country. Such nails have been given a shaking up in a hot tumbling barrel with a compound consisting mainly of resin, from which they issue with a thin, tough coating which greatly increases their holding power. The friction of the driven nail with the wood melts the cement and forms a glue, which makes fast the nail.

The product is used principally in wooden packing cases of all kinds, including boxes, barrels, crates. It is claimed that by their use there is less loss because of broken packages, less loss by theft because of the difficulty of prying open the cases and because of the squeak incident to the extracting of the nails. It is said that but one coated nail need be used for every two plain nails.

Cement coated nails are sold by count and correspond in number to a 100-lb. keg of standard plain wire nails. Coated nails are smaller than the standard wire nail in gage, and in most cases an eighth of an inch shorter, the average net weight being approximately 70 lb. per keg.

Coated nails were invented by Ira Copeland, Brockton, Mass., who died in 1915. Prior to their manufacture in this country they were seen in the United States only when they came in imported packages and were known in Mr. Copeland's vicinity as French nails. Mr. Copeland noticed that the lumber in which these French nails were driven was very resinous, and upon experimentation found that when the French nails were cleaned and driven into our native lumber they did not hold any better than American nails.

He then experimented with various combinations of vegetable gums, which resulted in a patent issued to him in May, 1887. Since Mr. Copeland was a school teacher, and not in a position to engage in manufacture, he sold licenses to manufacture under his patent to about 25 concerns scattered over the United States and Canada. Only at Whitman, Mass., however, was any serious attempt made to manufacture and market this product, and this was done under Mr. Copeland's observation and assistance.

In the early nineties James C. Pearson bought Mr. Copeland's interests and recalled by purchase most of the outstanding licenses. He secured Pittsburgh manufacturers to make the nails for him, all of whom are now either out of business or incorporated in the American Steel & Wire Co.

The first attempts at commercial coating were made by using a very complicated machine, also the inven-

tion of Mr. Copeland, which gave slow output and inferior product as compared to that of to-day. Upon moving to Pittsburgh Mr. Pearson simplified the process, using a simple tumbling oven, which was later developed by the leading interests in the coated nail business into efficient and speedy machines.

Many carpenters are prejudiced against the use of such nails, because they cannot place them in their mouths and because they soil the hands. In packing delicate goods there is objection sometimes lest they soil the goods. Because of their extreme holding power, they are not suitable for house finishing work or cabinet work where boards may have to be taken off for replacement or adjustment.

A cement coated nail is of mottled appearance, with blotches of the glue-like brown coating, through which shows the steel color of the nail. The heat of the hands slightly melts the coating and makes it sticky. The growth of its use has kept pace with the growth in the use of wire nails. A recent adaptation was that for the wooden molds for the concrete of the stadium of Princeton University.

There are many manufacturers of this product on a small scale in the United States. Some have attempted to use paints or varnish, but the resinous mixtures seem to have been the most successful.

Nut, Bolt and Rivet Institute

At the annual meeting of the Nut, Bolt and Rivet Institute, held in the Waldorf-Astoria Hotel, New York, Jan. 22, officials for the current year were elected as follows: N. J. Clarke, Lake Erie Bolt & Nut Co., Cleveland, president; R. W. Gillespie, Bethlehem Steel Co., Bethlehem, Pa., vice-president; F. H. McIsaac, Kirk-Latty Mfg. Co., Cleveland, treasurer, and C. M. Best, secretary. The executive committee includes the above named officials, excepting the secretary, and new members of the executive committee were elected as follows: David J. Champion Champion Rivet Co., Cleveland; R. H. Hill, Michigan Bolt & Nut Works, Detroit; O. G. Knapp, Clark Brothers Bolt Co., Milldale, Conn. Other members of the executive committee, whose terms had not expired, include H. C. Graham, Upson Nut Co., Cleveland; W. F. McKenzie, Buffalo Bolt Co., Buffalo, and Charles J. Graham, Graham Nut Co. Pittsburgh. A. J. Eddy continues as general counsel.

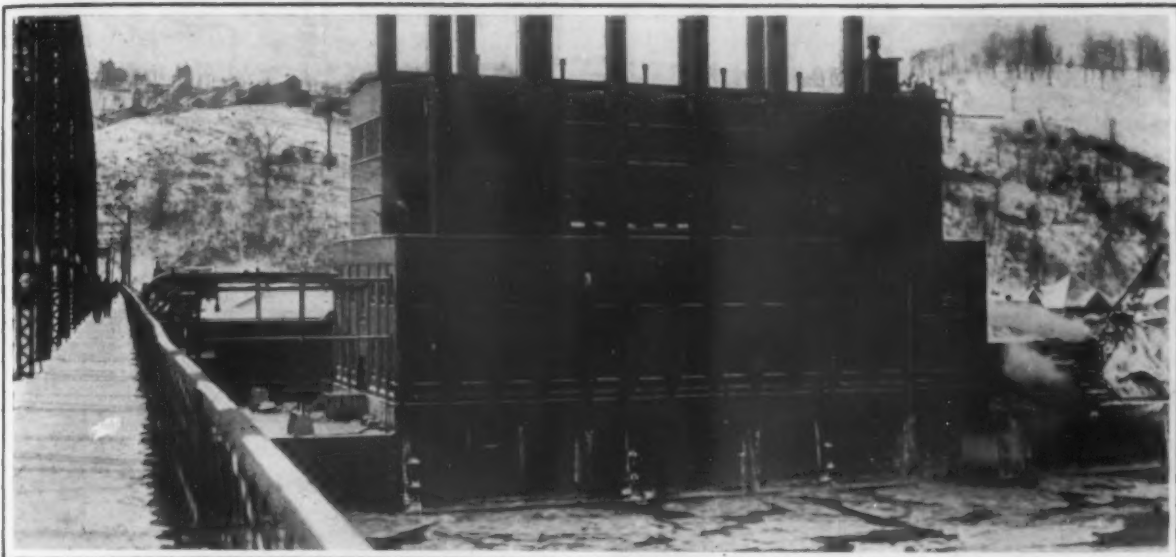
American Malleable Castings Association Election

At the annual meeting of the American Malleable Castings Association held in Cleveland Jan. 14, officers for the following year were elected as follows:

President, John A. Penton, Cleveland, succeeding F. R. Angell, Northern Malleable Iron Co., St. Paul, Minn.; vice-president, Western section, E. E. Walker, Erie Malleable Iron Works, Erie Pa.; vice-president, Eastern section, Frank J. Eppele, president Trenton Malleable Iron Co., Trenton, N. J.; secretary and treasurer, Robert E. Belt, re-elected. Two additional members were added to the research committee, which also acts as the executive committee. These are: E. M. Griswold, Frazer & Jones Co., Syracuse, N. Y., and John E. Walker, Wilmington Malleable Iron Works, Wilmington, Del. John C. Haswell, president Dayton Malleable Iron Co., Dayton, Ohio, is chairman of the executive committee.

The Hooven, Owens & Rentschler Co., builder of marine and stationary engines, Hamilton, Ohio, at the annual meeting held Jan. 20, re-elected the following officers for the ensuing year: G. A. Rentschler, president; W. B. Mayo, vice-president; Gordon S. Rentschler, secretary-treasurer. Other members of the board of directors are Clarence H. and George H. Helvey.

The Duncannon, Pa., plant of the Lebanon Iron & Steel Co. has resumed operations in its 12-in. mill, and is planning an early resumption of work by the 8-in. mill and scrap furnace. The plant closed during the lull in the steel industry last spring.



Coal Handling Features New Boiler Plant

Crushed Fuel Transported from a Wharfage
Storage Basin by Tunnel Conveyor, Bucket
Elevator, Belt and Shuttle Conveyors to Bunkers

THE McKeesport Tin Plate Co.'s plant, which is the largest single tin plate plant in the United States, is located on the Youghiogheny River, about one and one-half miles above its junction with the Monongahela River, and opposite McKeesport, Pa. This plant has always received its coal by river craft. The space available for a new boiler house was limited, and space had to be had for storage of coal on account of the transportation of coal by water being interrupted during part of the winter months. The undertaking, therefore, not only involved the construction of the boiler house with its equipment, but also a coal storage basin and wharfage.

The provisions for wharfage consisted of a concrete wall built on the harbor line, about 34 ft. high, 19 in. wide at the base, and setting on wooden piles. A railroad track for a locomotive crane is provided along the top of this wall over that portion where coal is unloaded. The coal is lifted from the barges with a clam shell bucket by the crane, and is deposited in a storage basin lying between the dock wall and a parallel wall 85 ft. inshore.

A track runs along the center of the basin, supported on a concrete structure, which encloses a tunnel communicating with the outside by a slot running the whole length of the tunnel and lying between the rails of the track. The track permits the use of a traveling crusher equipment which deposits coal of the required degree of fineness through the slot upon a belt conveyor running the length of the tunnel and discharging into a bucket elevator which runs to the top of the boiler house, and distributes into the overhead bunker by means of a suitable belt conveyor arrangement and shuttle. The slot through which the coal is discharged as it leaves the crusher is provided with gates which are only open at the position where the crusher car stands, thus to form a hopper to guide the coal into the slot.

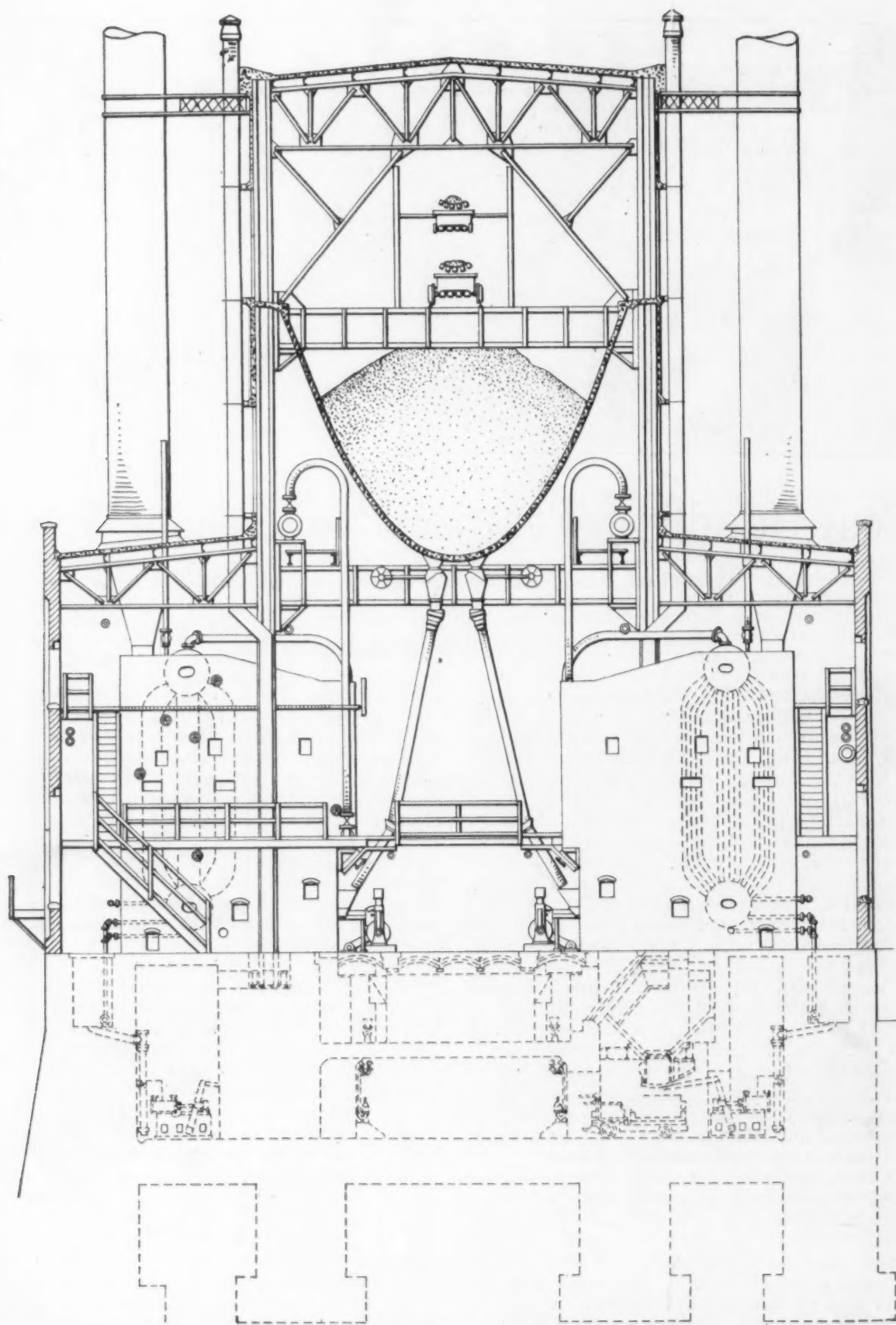
The crusher car with the crusher equipment, feed belt and hopper were furnished by the C. O. Bartlett & Snow Co., Cleveland. The crusher is of

four roll type. The car is provided with standard railway type motors, the Simplex contact system being used instead of trolley wires or third rail. This arrangement is such that the hopper can always be in the right position to receive the coal from the locomotive crane without requiring the crane to make any extra movements to reach its point of discharge.

Between 50,000 and 60,000 tons of coal were stored in this coal pocket and on the wharf prior to the coal strike. Under ordinary conditions, however, it is not expected to store over 15,000 tons in the pocket, wharfage space and overhead bunker combined.

The coal handling machinery consists of the conveyor in the tunnel, the bucket elevator, stationary belt conveyor running half of the length of the overhead bunker and shuttle conveyor traveling on a track construction provided for it on top of the bunker for distributing the coal in the bunker. All of this machinery was furnished by the Link Belt Co., Philadelphia. It has a capacity of 120 tons per hr., and is driven by Allis-Chalmers motors with Cutler-Hammer interlocking control so arranged that in case any portion of the device is shut down all other coal handling apparatus including the crusher is automatically stopped; also the crusher and its feeder cannot be operated until all of the balance of the coal handling mechanism is set in motion. The coal bunker has a capacity of approximately 5000 tons and is built of reinforced concrete. The reinforcements, gates, spouts and construction work were carried out by the Brown Hoisting Machinery Co., Cleveland.

There are 12 606-hp. water tube, high arch, vertical type Ladd boilers, each equipped with an eight retort Sanford-Riley stoker, and Sturtevant air equipment, which includes turbines for driving the fans. The air is led to the stokers through a plenum chamber communicating with each stoker through a wind gate arrangement, set opposite the center of each boiler in the plenum chamber wall. Sterrit-Thomas lock doors provide access at all



Sectional View of the Boiler House. The coal bunker has a capacity of 5000 tons and is built of reinforced concrete. A bucket elevator brings the coal to the stationary belt conveyor which runs half the length of the overhead bunker. A shuttle conveyor travels on a track construction on top of the bunker and distributes the coal to the bunker. A sub-cellar beneath the planum chambers accommodates electric side dump ash buggies which convey the ashes to an automatic ash skip hoist at the end of the building

times to the planum chamber and to wind chambers under the stokers. Both planum chamber and compartments under the stokers are provided with electric lighting. Ample space is provided in the wind chamber compartment for inspection and repairs of the stokers and for disposal of siftings.

The stokers are individually driven by an in-

closed type Wachs engine and are arranged so that two stokers can be driven by the same engine in case of breakdown. The stacks are supported on heavy structural steel bracing forming part of the boiler setting, and are braced against wind by a series of struts combined with the building structural steel framework. The stacks are 6 ft. in

No. 6474

diameter, and 150 ft. in height measured from the base and were built by R. Munroe & Sons Co., Pittsburgh. The stack dampers are carefully balanced with due provision for expansion and are operated by means of control apparatus. This control is interlocked with a control for governing the speed of the stoker engines and controlling the wind gates, each boiler being provided with its own individual equipment. All control apparatus was furnished by the Hagan Corporation, Pittsburgh.

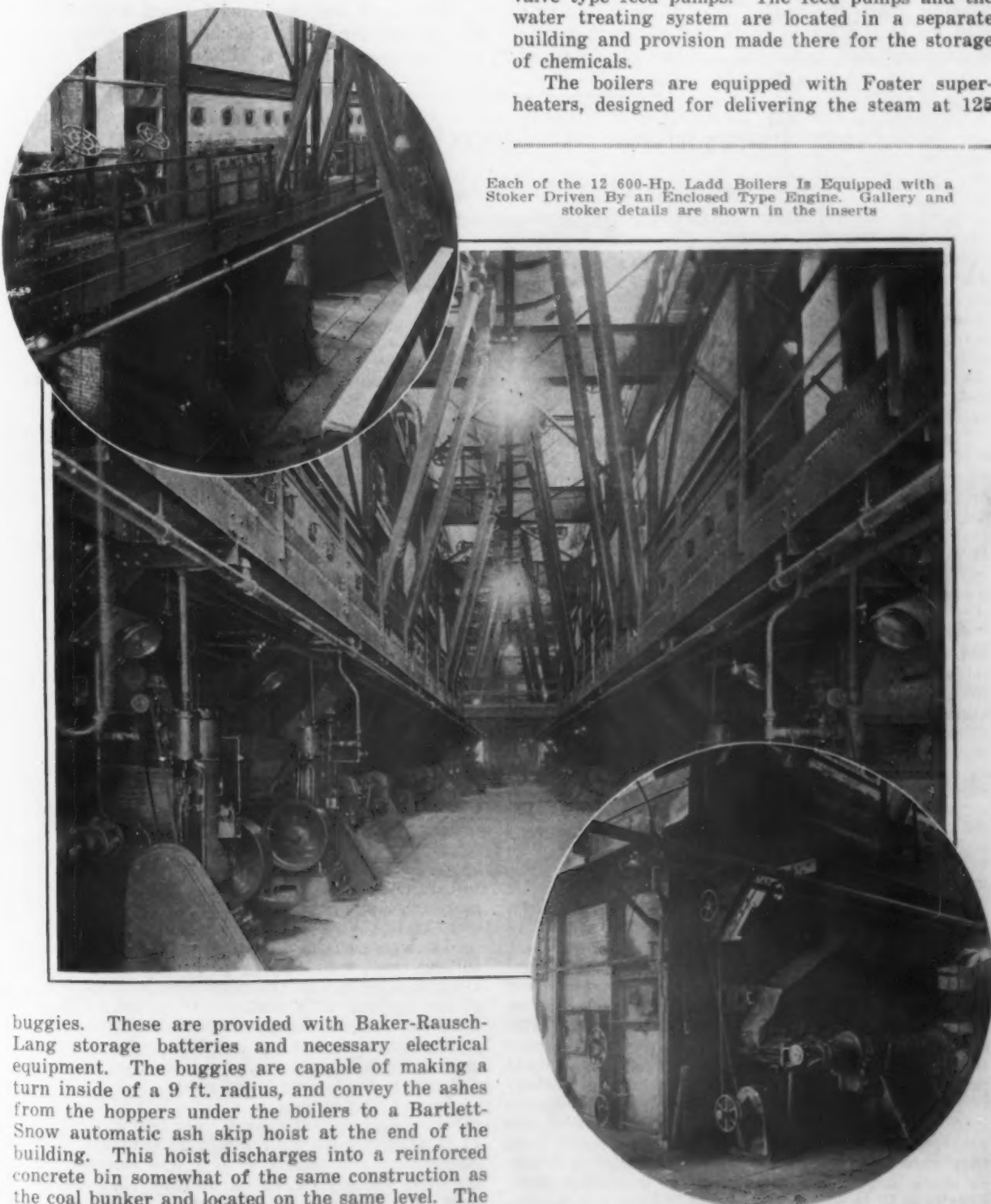
Beneath the planum chamber there is a sub-cellar for the accommodation of side dump ash

ing plates, lined with fire-brick, and provided with suitable spray pipes. The cast iron construction is combined with heavy cast-iron neck pieces, which in turn support runners for curved ash gates operated by low pressure hydraulic cylinders. The ash gates have sufficient extension beyond the necks so that, when filled with water, a reliable seal is formed against the passage of air into the ash bin. This work was furnished by the Gillespie Mfg. Co., Pittsburgh.

Youghiogeny River water is used, treated by the Cochran-Sorge system delivered to the boilers by Epping-Carpenter compound direct-acting pot-valve type feed pumps. The feed pumps and the water treating system are located in a separate building and provision made there for the storage of chemicals.

The boilers are equipped with Foster superheaters, designed for delivering the steam at 125

Each of the 12 600-Hp. Ladd Boilers Is Equipped with a Stoker Driven By an Enclosed Type Engine. Gallery and stoker details are shown in the inserts



buggies. These are provided with Baker-Rausch-Lang storage batteries and necessary electrical equipment. The buggies are capable of making a turn inside of a 9 ft. radius, and convey the ashes from the hoppers under the boilers to a Bartlett-Snow automatic ash skip hoist at the end of the building. This hoist discharges into a reinforced concrete bin somewhat of the same construction as the coal bunker and located on the same level. The bin is provided with chutes and gates so located and arranged that the ashes can be loaded either into railroad cars or motor truck. The ash bin and its equipment was furnished by the Brown Hoisting Machinery Co., Cleveland.

The ash hoppers are built on cast-iron support-

deg. superheat. The boilers are designed for 200 lb. pressure per sq. in. The Republic steam flow meter is used, each boiler being provided with an individual meter, also a totalizing flow meter on the main steam line. All of the steam piping, both

for high and low pressure, also all feed water, blow-off, and service water piping was furnished by the Crane Co., Chicago.

The coal bunker arrangement with its relationship to the building construction work and window openings is such that daylight is reflected to the boiler house floor, and the best of ventilation is provided both above the coal bunker and for the space below. The space above the bunker is sealed off from the lower part of the building, thus to prevent coal dust from sifting down into the boiler house. The ash tunnel is ventilated by flues provided alongside of the building columns, and extending above the roof. The buildings are brick clad up to the leanto roofs and above that point are covered with metal lath and cement. The roofs

are of concrete, waterproofed with composition roofing.

The boiler house floor is about 8 ft. above the yard level, made necessary by occasional floods. The foundation work is all waterproofed and pumps provide for accumulation of drainage water from the ash pits during floods.

Structural steel work entering into the building construction of boiler house and heater house was furnished by the Fort Pitt Bridge Works, Canonsburg, Pa., and the general contractor for the buildings was the Lawrence Steel Construction Co., Pittsburgh.

The plant was designed by and erected under the supervision of S. Diescher & Sons, consulting and erecting engineers, Pittsburgh.

New Ferroalloy for Deoxidizing Molten Iron

Ferrocium Has a Low Melting Point and Marked Affinity for Oxygen—How It Is Made and Used

A NEW ferroalloy for deoxidizing molten cast iron was discussed at the annual meeting of the American Foundrymen's Association in Philadelphia, Oct. 2, in a paper by Dr. Richard Moldenke, entitled "Cerium in Cast Iron." The author, after stating that while it is desirable to make iron as free from oxygen as possible so as to render the use of deoxidizers unnecessary, the use of such alloys is not only necessary but beneficial in many cases.

In adding such alloys to molten iron Dr. Moldenke said that the best method is to sprinkle the granulated material in the stream as it issues from the cupola or furnace spout. In this way the alloy becomes red hot by the time it enters the ladle and assimilates readily. Putting lumps of the material in the bottom of the empty ladle or introducing them after the ladle has been filled always permits of some oxidation and consequent loss of the usually expensive alloys, as they will float on the surface until melted and absorbed.

Until recently the best known deoxidizers were silicon and manganese in the form of high percentage ferroalloys. Ferrotitanium and ferrovandium are more powerful in their action; the former is more particularly useful for steel on account of its high melting point. Aluminum is very useful also but unless it is pure it may produce bad consequences. Magnesium and sodium as ferroalloys are still too unknown in the foundry to count.

A recent addition to the list is the metal cerium. As it melts at 1180 deg. Fahr., its ferroalloy lends itself readily to assimilation in molten cast iron.

The Source of Cerium

The general source of the metal is in the Monazite sands of Brazil and India. These sands are worked up for their thorium content (running up to 6 per cent in the Brazilian and 9 per cent in that from India); the nitrate of this metal is used in the manufacture of gas mantles. Monazite sands also contain about 60 per cent of the oxides of the rare earth metals, principally of the cerium group. This group also includes the rare elements lanthanum, samarium, and neo and praseodymium. In addition there is a small percentage of yttrium. These elements are obtained in the residue from the preparation of the thorium nitrate, and in the subsequent chemical and electrolytic processes used they enter the cerium alloy, forming what is known as misch metal. The composition of this misch metal usually is 50 to 60 per cent cerium, 25 per cent lanthanum and 15 per cent didymium, samarium, etc. There will also be about 1 to 2 per cent iron present.

The chemical and physical properties of these rare metals are very similar, so that the mixture as above given will accomplish everything that may be expected of any one element. To separate them, except the cerium, would prove impracticable commercially. While

the melting point of cerium is reasonably low, those of the concomitant elements are considerably higher. The melting point of the misch metal may therefore be taken at about 1380 deg. Fahr. In actual practice this alloy is further diluted with iron to the extent of 30 per cent, so that the melting point of the alloy as added to the molten iron in the foundry is about 1480 to 1650 deg. Fahr., or well within the melting point of cast iron.

The cerium alloy known as misch metal is soft graying-blue in color and quite stable in perfectly dry air. It tarnishes slowly in moist air. It alloys readily not only with iron, but also with nickel, copper, magnesium, zinc, etc., and hence can be united with any of these for introduction into the respective nonferrous alloys as well as into steel and iron. When made into an alloy of 70 per cent misch metal and 30 per cent iron, it is known as an exceedingly valuable "pyrophoric alloy" and is used in the manufacture of ignition devices of various kinds, used in safety lamps, cigar and gas lighters, etc.

Active Chemically

The cerium group of metals is exceedingly active chemically. They have a very great affinity for oxygen, and the heats of formation of the oxides run in the range of those for aluminum and magnesium. The result is the liberation of great quantities of heat besides the scavenging action on the metal into which the cerium alloy is introduced. This, besides purifying the metal before pouring, prolongs the fluidity of the metal appreciably. It may therefore be expected that castings will be softer and more dense, as feeding through the gates and risers is prolonged and the formation of combined carbon is retarded correspondingly.

The tests mentioned below were made with gray and chilling irons, with varying proportions of the cerium alloy, in order to note the improvement in the strength of the castings as a consequence of the additions in question. Unquestionably the deoxidizing action was excellent, but whether any beneficial results other than greater machinability and soundness can be obtained will remain for further investigation.

In making additions to a ladle full of molten iron experience shows that about 0.1 per cent of the element to be experimented with should be sufficient to effect deoxidation, and usually none of the element can be traced in the casting unless at least that amount is used. If the percentage is increased the excess of the element in question above the quantity necessary for deoxidation will alloy with the iron itself and may or may not give additional beneficial properties to the metal. Hence in the tests made, the additions amounted to 0.05, 0.10 and 0.15 per cent cerium, lanthanum, etc. These figures are based upon an alloy containing 70 per cent of the rare metals in question.

The first series of tests was with an all pig-iron mixture, the analysis of the castings being silicon, 2.70; sulphur, 0.07; manganese, 0.60, and phosphorus, 0.64 per cent. The results given are the average of four standard test bars of 1½-in. diameter in each case:

Additions	Transverse Strength, lb.	Deflection, In.
No cerium, lanthanum, etc....	2090	0.11
0.05 cerium, lanthanum, etc....	2450	0.12
0.10 cerium, lanthanum, etc....	2660	0.13
0.15 cerium, lanthanum, etc....	2840	0.13

The next series was from a 60 per cent pig and 40 per cent scrap mixture. It was good soft machinery iron, with an approximate analysis of silicon, 2.40; sulphur, 0.10; manganese, 0.55 and phosphorus, 0.68 per cent. The results given are the average of four standard test bars in each case:

Additions	Transverse Strength, lb.	Deflection, In.
No cerium, lanthanum, etc....	2740	0.09
0.05 cerium, lanthanum, etc....	3110	0.10
0.10 cerium, lanthanum, etc....	3240	0.11
0.15 cerium, lanthanum, etc....	3280	0.13

The final series was made from remelted car wheels, giving close-grained iron castings. The analysis approximated: Silicon, 0.55; sulphur, 0.13; manganese, 0.40, and phosphorus, 0.40 per cent. The results given are the average of four standard test bars in each case:

Additions	Transverse Strength, lb.	Deflection, In.
No cerium, lanthanum, etc....	3790	0.11
0.05 cerium, lanthanum, etc....	4080	0.14
0.10 cerium, lanthanum, etc....	4190	0.15
0.15 cerium, lanthanum, etc....	Bars defective	

The standard 1½-in. round test bars were cast into cores standing vertically with top pour. The cores were parked in a mold bedded in the floor, the bottom being carefully prepared with crushed coke and a thin cover of molding sand. The sand between the cores was well vented, yet in spite of all precautions, the last set proved insufficiently so for the 0.15 cerium addition, and the bars were imperfect.

Effect of Artificial Cooling

Chill blocks were cast from each ladle so that a comparison might be made between normally set metal and when artificially cooled. The results were highly instructive, as the fractures indicated a prolongation of the setting period for metal treated with cerium, as against the untreated metal.

It was noted that the chill tests of the gray iron sets showed relatively softer metal and fractures with smaller chilled rims for the treated material than for the original metal from the same ladles. The remelted car wheels gave exceedingly strong test bars, the treated ones considerably grayer than the untreated ones. The chill tests showed mottling for some of the treated metal whereas the untreated chills had absolutely white fractures with magnificent crystallization.

The conclusion follows that in deoxidizing by means of cerium, as with any deoxidizer, the purified molten metal is given a better chance to set under natural condition, being relieved from a too rapid freezing action with consequent formation of undue amounts of combined carbon. The metal, therefore becomes softer, is machined more easily, is freed from gas and pin holes, undue casting strains and has less internal shrinkage than where the metal suffers from more or less oxidation through imperfect melting practice.

Other Investigations Verified

The above tests, made in the foundry of the writer, were undertaken to supplement a long series of daily tests at the Chicago Hardware Foundry Co., where a uniformly good increase in strength, machinability and soundness of castings was found as the result of cerium additions. The results at the two foundries are about the same. The interesting feature of the analyses made is that with additions of as much as half a per cent of cerium none could be found in the castings. Evidently the avidity of cerium for oxygen is so strong that after a portion has been used up in the molten metal the balance must have been oxidized by continued contact with the air over the ladle.

It is one of the noticeable features of the use of this alloy that much slag is taken from the molten metal, partly through increasing the fluidity and the balance from the oxidation products of the alloy itself. The metal cerium and its concomitant elements lanthanum, etc., seem to be particularly powerful deoxidizing agents, whereas other deoxidizers seem to have this property limited up to a certain point, any excess remaining in the casting.

Canadian Standards Association

The Canadian Engineering Standards Association was formed in 1919 with the object of carrying out in Canada for the benefit of Canadian industry work similar to that done in England by the British Engineering Standards Association. There is, as yet, no similar governmental organization in the United States, although the Bureau of Standards at Washington has worked along somewhat similar lines to the British and Canadian Engineering Association.

The Canadian association's chief duties are investigation and experimentation. The federal government has made a grant of \$10,000 toward expenses, the balance of the support being derived from contributions from the different technical and industrial societies interested, as well as individual firms. The members who serve on the committees are nominated by such bodies as the Canadian Manufacturers' Association, Canadian Mining Institute, Engineering Institute of Canada, the engineering schools of the three largest Canadian universities, the railway services, important industrial firms, and the chief purchasing departments of the Dominion government.

The association has been incorporated as a company, though not operated for profit, and its administrative organization comprises a main committee, with a chairman, two vice-chairmen, honorary secretary, and a secretary. The latter is Colonel Durley, whose office is in room 112, West Block, Parliament Buildings, Ottawa. The various sectional and sub-committees, to whom the actual technical work is entrusted, report their findings to the main committee for approval.

The procedure toward the adoption of a standard is somewhat similar to that followed by the National Screw Thread Commission in the United States, in that the actual discussions regarding technical details are carried out by representatives of the manufacturers. The various interests, whether of the producer, the user or the engineer, are safeguarded, since all these parties have a voice in the decision reached.

Committees are now considering for standardization such items as galvanized wire, rails and track fastenings, wire rope, steel railway bridges, screw threads, steel, machine parts, external characteristics of pole and service type transformers, aircraft parts, etc.

The screw threads committee is looking toward the international standardization of screw threads and will co-operate with similar committees in Great Britain and the United States. The sectional committee on steel is dealing now specifically with specifications for steel billets for forging purposes. The committee on machine parts will consider such questions as standard forms for rivet heads, bolt heads, nuts, etc. Further subjects under consideration include the following: Canadian electrical code, standard sizes for mining drill steel and drill chucks; railroad switches and frogs; tooth, sprocket and bevel gearing; automobile details and components; coil chains, etc.

There will be few cases, it is expected, in which the formulation of distinctively Canadian standards will be necessary. As a rule, decisions will be largely influenced by the practice in Great Britain or in the United States. This, of course, does not apply in all cases, as there may be climatic conditions in Canada which would affect the situation, as for example, in the making of cement.

Because the railroads confiscated approximately 3000 tons of coal consigned to the General Electric Co., Pittsfield, Mass., its foundry was obliged to close Jan. 19.

SYSTEM IN FOUNDRY OPERATION

How to Secure Best Results in Combining Hoisting Apparatus With Molding Equipment

A means of solving some of the difficult problems of foundrymen who are trying to systematize their work and costs was discussed in a paper "How to Secure Best Results in Combining Hoisting Apparatus With Molding Equipment," presented by W. C. Briggs, Shepard Crane & Hoist Co., New York, before the annual convention of the American Foundrymen's Association, Philadelphia, week of Sept. 29. The scheme outlined was intended to suggest methods that will assist the larger number of foundrymen who make a variety of sizes and weights of castings

Labor Is Big Problem in Foundry

"The question of labor cost," Mr. Briggs stated, "is more and more becoming a big problem with all foundrymen and exists from the time the raw materials arrive until the finished castings are loaded. In order to reduce the number of common laborers to a minimum, designers give entirely too much consideration to the handling of raw materials, loading of castings, etc., where the total pro rata cost per ton is a much smaller factor than the skilled workman's time on the molding floor.

"This, of course, is not true in all cases, but is apt to be true in the case of the jobbing foundry where the owner or engineer has in most cases failed to find a means for making a layout of the foundry with foundry floors, cranes, hoists and molding machines so combined that they are adapted to handle to the greatest advantage a predetermined class of work.

"If, however, each pattern when received is placed in a definite classification as outlined in the following table it will be possible to use hand molding and hand lift where it can be used with the highest efficiency, and hand molding and crane equipment where it will be more efficient, and likewise machine molding and hand lift where these factors can be combined to produce the largest tonnage:

Class	Size of Flask	Hand Molding Hand Lift	Crane Lift	Machine Molding Hand Lift	Crane Lift
1	18x18x6	1—HMHL	1—HMCL	1—MMHL	1—MMCL
2	18x18x12	2—HMHL	2—HMCL	2—MMHL	2—MMCL
3	24x24x6	3—HMHL	3—HMCL	3—MMHL	3—MMCL
4	24x24x12	4—HMHL	4—HMCL	4—MMHL	4—MMCL
5	24x30x6	5—HMHL	5—HMCL	5—MMHL	5—MMCL
6	24x30x12	6—HMHL	6—HMCL	6—MMHL	6—MMCL
7	36x36x6	7—HMHL	7—HMCL	7—MMHL	7—MMCL
8	36x48x8	8—HMHL	8—HMCL	8—MMHL	8—MMCL
9	36x48x12	9—HMHL	9—HMCL	9—MMHL	9—MMCL
10	48x48x8	10—HMHL	10—HMCL	10—MMHL	10—MMCL
11	48x48x12	11—HMHL	11—HMCL	11—MMHL	11—MMCL
12	48x60x12	12—HMHL	12—HMCL	12—MMHL	12—MMCL
13	60x60x12	13—HMHL	13—HMCL	13—MMHL	13—MMCL
14	60x72x12	14—HMHL	14—HMCL	14—MMHL	14—MMCL

Tag Patterns According to Classification

"The writer has not intended to carry this classification into all the sizes of flasks or depths of cope and drag that some foundries no doubt find it advisable to classify, and will simply outline the general scheme. The plan proposed is to place this classification list in the hands of the patternmaker or the man who has charge of the flasks so that suitable tags or stencilled markings may be applied to the pattern.

"Tonnage of castings is very largely influenced by the ratio between the size of the flask and the weight of the casting and the cost of molding follows in much the same ratio. Therefore with a system of this kind, the matter of setting the price is simplified. For instance, if a casting weighing 50 lbs. is produced in classification No. 1, the same casting produced in class No. 2 would cost more, and by keeping the cost of castings made by each classification, a table soon could be prepared that would be of great assistance in estimating the cost of making all kinds of castings.

"Of course there are many other elements that enter into the cost, but most of these elements do not influence the price anything like the ratio between the size of flask, which governs the amount of labor to a large extent. It is realized that green sand and dry

sand molding costs vary, and that the kind and size of cores are important elements."

These classifications were also pointed out as a help in solving the cost problem which has been found so difficult in foundries turning out a large variety of work. Mr. Briggs emphasized the importance of employing the man's energies properly in order to produce more and better results. He pointed out that the moulder would get started with much more dispatch if a system were used whereby the preparation factors were taken care of in a systematic way.

Proper Crane Facilities Essential

Those that make a large variety of work from castings weighing a few pounds to those weighing several tons were criticized as frequently not having facilities for handling the kind of work they are to make. "Often no attempt has been made," he said, "to establish even approximately the floor area required for handling facilities best adapted for the particular kind of work to be made because the designer did not have a clear conception of the size and weight and volume of each kind of casting to be made. If, however, the pattern is classified when received or made, into the size of flask which automatically establishes the approximate volume of sand and weights to be handled, the problem of designing the building, distributing the work, providing molding machine and crane equipment can readily be solved."

Mr. Briggs pointed out that in the past the handling apparatus, whether overhead traveler, jib crane or monorail hoist, has been considered as a necessary evil or an auxiliary equipment instead of being considered as a great aid in producing maximum results providing the handling equipment is selected to serve the particular operations required. Actual installations of cranes were then described and economies effected by their use were pointed out. In conclusion, Mr. Briggs stated that very many foundries, especially the jobbing foundries, can greatly increase their production and make the job easier for both owner and workmen by giving more careful study to the pattern before it goes to the foundry and by standardizing flasks and then allotting, as far as possible, definite floor space, suitable handling facilities and molding machines for the work.

Increase in Number of Employees

A comparison of the number of persons employed by some of the large manufacturing concerns located in New Britain, Conn., with the number employed by the same firms in 1910, gives some idea of the expansion of industry at that center and elsewhere in New England. Following is the name of the firm employing help, the number employed to-day and the increase as compared with 1910:

Firm	Employed 1920	1910	Increase
North & Judd.....	1,100	800	300
New Britain Machine Co..	1,403	385	1,018
Union Mfg. Co.	450	200	250
Am. Hardware Corp.....	6,000	5,000	1,000
Fafnir Bearing Co.	650	150	500
Stanley Works	3,000	1,900	1,100
Stanley Rule & Level Co.	1,068	*	*
Hart & Cooley.....	200	130	170
Vulcan Iron Works.....	242	200	42

*Accurate figures are not available.

Booklets on Commercial Correspondence

Commercial correspondence has been analyzed in a series of twelve booklets by James A. McQueen, manager of mail sales, the B. F. Goodrich Rubber Co., Akron, Ohio. The series covers the following subjects: Form letters that sell, the right sales letter, selling the dealer, faulty expressions in dictation, building goodwill through courtesy, good paragraphing, clearness, conciseness, handling the angry customer, the mechanical make-up of a letter, the beginning and the ending of a business letter. Booklets containing useful suggestions and rules for stenographers, for dividing words in commercial letters, and for the care of the office desk and its surroundings have also been issued by the company.

Distinguishing Lead in Brass and Bronze

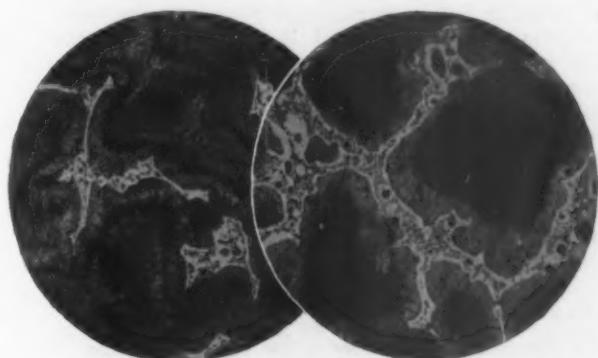
Application of Sulphide Etching to These Alloys—Detecting the Unequal Distribution of Both Lead and Copper—Effect of Annealing

BY O. A. KNIGHT*

ALTHOUGH etching metals by means of gases and alkaline sulphides has been suggested in some of the early treatises on the subject of metallography, the author has obtained a number of photomicrographs, two of which it is believed will be found especially interesting in connection with the microscopic examination of brass and bronze for contained lead.

It is generally known among metallurgists that lead contained in brass or bronze is present as one of the distinct constituents, that is, it is not found in solid solution. Since the melting point of lead

as solutions of hydrogen sulphide worked equally well. In all instances the copper-tin alloy is acted upon rapidly and darkened to a degree dependent upon the etching time and the strength of the etching solution, while the lead is unattacked and stands out as a very distinct light constituent. This is clearly illustrated in the photomicrographs. Fig. 1 represents the structure of the specimen taken from the outside, while Fig. 2 shows the structure of the one taken from the center of the ingot. It will be seen at a glance that the inside has a much higher percentage of



Photomicrographs Figs. 1 and 2 Show the Structure. Reduced One-Half from an Original of 500 Diameters, of an Alloy of the Following Composition:

	Per Cent
Copper	84.50
Tin	12.50
Lead	3.00

Fig. 1 (left) represents the outside of the ingot near the bottom. It was etched 5 sec. in a 10 per cent sodium sulphide solution. Fig. 2 is from the inside of the ingot near the bottom. It was also etched 5 sec. in a 10 per cent solution of sodium sulphide

is much lower than the brass or bronze alloy, this constituent will be found around the grain boundaries to which place it was rejected during the solidification of the higher melting point alloy. Also in relatively large ingots or castings where the cooling is comparatively slow and the metal solidifies slowly from the outside to the center, the central portion which solidifies last will contain higher percentages of lead than the outside. And further, in many instances, the bottom portion of the ingot or casting will be found to contain a larger percentage of lead than the top, which is due to the greater specific gravity of lead.

An ingot approximately 4 in. in diameter and 15 in. in length was cast. The copper and tin were melted in a crucible inside a coke-fired furnace and a few minutes before removing the crucible from the furnace, the lead was added and the metal stirred vigorously. The crucible was then removed from the furnace and the metal again stirred just before it was poured. It was then poured and allowed to solidify. Considerable time was consumed during the solidification period which allowed the lead to segregate to a rather high degree, as will be shown later.

Specimens were cut out for microscopic examination from the outside and center at near the bottom and top of the ingot. All were carefully polished and examined. Sulphide solutions employed as etching reagents revealed the lead remarkable well. Dilute (10 per cent) solution of sodium sulphide and potassium sulphide as well

lead than the outside, and the manner in which the lead is arranged in a sort of network around the grains is also shown.

The specimens taken from the top of the ingot were lower in lead than the corresponding ones taken from the bottom which can readily be accounted for by the greater specific gravity of lead together with the fact that it took a number of minutes for the metal to solidify after being poured into the mold.

Another point of interest might be mentioned which is shown very vividly in the photomicrograph, Fig. 2, and to a lesser degree in Fig. 1. This is the light area on the copper-tin alloy proper which immediately surrounds the lead. By reference to the copper-tin equilibrium diagram it will be seen that upon cooling an alloy of the composition given above as regards copper and tin, the metal which solidifies first is richer in copper than that which solidifies last. Consequently the center of the grains will have a higher copper content than the outside. If an alloy of this composition is not annealed properly, diffusion does not ordinarily take place to a degree sufficient to give a perfectly homogeneous solid solution.

The alloy from which the accompanying photomicrographs were taken was not annealed previous to removing the specimens for microscopic examination, consequently the center of the grains will be higher in copper than the outer portions. Sulphide etching shows this phenomena in a very excellent manner as will be seen by inspecting photomicrograph, Fig. 2. The central portion of the grains, being highest in copper percentage, is more rapidly darkened than the outside area.

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Thus this reagent serves not only to clearly reveal particles of lead but, if properly applied also, will serve to indicate whether the copper-tin alloy is homogeneous.

Lead inclusions in brasses are also revealed by

this method of etching, as well as in bronzes of other compositions. The specimens from which these photomicrographs were taken were etched five seconds in a 10 per cent solution of sodium sulphide.

The Forging of High-Speed Steels*

Temperature Limits and Their Effects on Cracking — Recommendations for Successful Results

BY A. H. KINGSBURY

GREAT emphasis has been brought to bear, during and subsequent to the war on the hot reduction of steel by either forging, rolling or the press, as indicated by the number of papers, discussions, etc., appearing in the metallurgical publications during the past three or four years. The great importance of this subject was recognized by the steel makers years ago, particularly those who specialized on alloy and ordnance steels. Those who have been connected with the production of such special grades, recognizing the marked effect this operation has upon the ultimate results obtained, have by constant investigation discovered what constitutes proper and improper forging. This has been a more difficult problem than it might seem to the layman, due to the fact that varying percentages of alloy, to get the best results necessitate more or less of a variation in treatment at the rolls, the hammer or press. Investigation has shown that alloy steels containing the elements chromium or nickel are particularly susceptible to variations in forging practice; those containing chromium or a combination of chromium and nickel are more sensitive than the non-chrome combinations. When it is borne in mind that practically all modern high speed steels contain the element chromium in excess of 3 per cent and this in combination with vanadium and large percentages of tungsten, the importance of careful forging becomes the prime factor in obtaining maximum results.

Practically all high speed steel tools are forged either by the consumer's blacksmith or are machined from a rolled or forged bar. The company with which the author is connected realized long ago that the forging of high speed steel was a most important factor in the final results obtained for its product and instituted a thorough system of inspection tests by which a constant check is kept on the roller or hammerman. Sections from the ends of bars are hardened, tested for hardness, fractured in a longitudinal direction and the structure carefully examined. If the grain shows sign of improper working or defects the bar is rejected and either scrapped or reworked, depending on the nature of the defect. It has been discovered that a transverse fracture does not show the effects of improper forging unless the abuse has occurred to a marked degree. However, the longitudinal fracture such as represented by these test discs does indicate plainly whether the bar has been properly or improperly handled at the mill or hammer.

Temperature Limits That Are Safe

In the forging of high speed steel the dense heat-resisting structure of the steel must be given due consideration and the fact that it possesses the property of being hard at low red heats should be sufficient to warn the forger that nine-tenths of the problem of successfully forging these steels is in the nature, the application and the degree of heating, and that working at low temperatures will invariably result in cracks, which may or may not manifest themselves until subsequent to hardening. The same is true of a piece that has been too rapidly heated to insure a thorough penetration of the heat.

*From a paper presented at the September meeting of the New York Chapter of the American Steel Treating Society. The author is with the Crucible Steel Co. of America, Harrison, N. J.

The writer's contact with various blacksmiths and forgemasters has indicated that the general tendency in the forging of high speed steels is to overheat the tools, some blacksmiths even approaching the hardening temperature because of the fact that they found the steel would work easier and added to the repeated warnings to keep well above a "red heat." An overheated piece of high speed steel, if it has not been heated to a degree where it will not forge, generally does not crack until after it has been ground, hardened and in some cases re-ground. Of course in cases of this kind the responsibility for failure is generally placed on the hardening or grinding operation and, if the trouble continues, on the steel. At times, particularly in tools of the larger sections the cracks may not develop until after the tool has been hardened for a period of time and in cutting it gives poor service, due to crumbling or on breaking displays a dry, woody, or flaky, weak fracture, easily distinguished from the characteristic structure of a normal high speed steel tool. This fracture is attributable to either or all of the following causes:

Forging at a white heat.

Heating for either forging or hardening in a fire where there is an excess of air.

The chances are three to one that the first mentioned is the cause for failure. These facts demonstrate conclusively that high speed steels, the same as other grades of steel, have maximum and minimum limits of temperature between which they can be successfully forged.

In discussing the ills resultant from improper forging, the author does not wish to convey the impression that the majority of high speed steels are necessarily super-sensitive for such is not the case. The problem of the manufacturers of high speed steels, catering as the large makers do, to a varying trade, is to make his product of such a nature that it will give the best results possible with reasonable care in the handling by that trade. The results obtained are invariably in proportion to the care exercised in the treatment, either forging or hardening, to which the steel has been subjected.

Recommendations for Successful Forging

These foregoing facts, coupled with the writer's connection with the production and subsequent treatment of high speed steel, lead him to assert that forging is probably the most important operation in the manufacture of a tool. The fact on which emphasis is placed is "the larger the section of the tool to be forged the greater the care necessary to accomplish the operation successfully." He appreciates the value of theory as a basis of discussion but feels that the subject of this paper should be treated at this time in as near a practical manner as possible. He, therefore, is going to hold as close as possible to recommendations which are based on actual practice.

The basis for these recommendations is a number of years of experience in the production department of one of the Crucible Steel company's plants during a period when he supervised the production, testing and treating of high speed steel. This and the investigation of difficulties experienced by the customer have naturally brought him into contact with many users of such steels. Inasmuch as his experience has necessarily been confined to the Champion and Rex brands of steel,

and realizing that difference of composition makes a difference in forging practice, he feels he is not competent to judge how much of the recommendations he makes will be applicable to other brands of steel; his experience shows, however, that the brands mentioned will give the best service when handled in the following manner:

If a forge is used it should be deep enough to always keep a body of fuel between the piece being heated and the blast, so that at no time during the heating should the blast impinge directly on the steel. Whether a forge or furnace is used, the atmosphere should be of a reducing or neutral nature, as an oxidizing flame is very injurious to a hot steel. Use plenty of coke or charcoal and avoid green fuel.

In heating the piece, apply the heat slowly and uniformly until it has attained a light yellow or lemon color (about, not over 2000 deg. Fahr.) and forge vigorously: don't nurse it, until the color has fallen to a bright red (not under 1500 to 1550 deg. Fahr.), then reheat it if further forging is necessary. When thoroughly heated in this manner the steel will flow freely under the hammer, and considerable work can be done before it has attained a temperature where reheating is necessary. In tools of larger section, say 2 in. by 1 in. and over, on the finishing heat for trimming or light forging, do not heat above an orange color (1700 to 1800 deg. Fahr.), as these sections if finished at high temperature invariably develop the structure mentioned in the former part of this paper as flaky, dry, woody or weak, which, though it may not cause actual fracture, will prevent the tool from working to a maximum. No treatment has been developed whereby dry, woody or weak structure in-

duced in high speed steels by forging can be reclaimed except by a proper re forging.

A good practice after forging, particularly if the piece is finished at a low heat, to eliminate forging strains, is to reheat to about 1600 to 1700 deg. Fahr. and allow to cool slowly in charcoal, lime or ashes, etc.

For bending the nose of a boring tool at right angles to the shank, the piece should be brought slowly, with as little blast as possible, to an even heat. As most of the actual work on this class of tool is bending and trimming to the desired shape, little actual forging is done, and as a consequence the bend should be made at a heat somewhat below the regular forging heat used on other classes of tools, say between 1700 and 1800 deg. Fahr. A bend of this character can easily be made with a piece that has been slowly and thoroughly heated to this temperature. A tool of this description bent at a high heat is not necessarily ruined, but it is weak in structure and does not work to the best advantage.

At first thought these recommendations may seem difficult to carry out. This is not the case as the tool dresser generally takes considerable pride in the work and generally welcomes suggestions, information, etc., which will assist him in obtaining the desired results. Many such men have had practically the same instructions as set forth in this paper and the fact that the information has not had to be handed to them a second time should be sufficient proof that the tool dresser has experienced little difficulty, if any, in carrying them out.

Developments in Electric Pig Iron and Steel

Status of Electric Pig Iron—Role of Single Arc Furnaces for Steel —Premelting Ferromanganese—Electrodes for Induction Furnaces

IN the symposium on electric furnaces which was a feature of the meeting of the Iron and Steel Institute in London last spring, J. Bibby presented a paper on "Developments in Electric Iron and Steel Furnaces." The author discussed both electric pig iron and electric steel. An abstract follows:

The manufacture of pig iron in a blast furnace requires, on an average, one ton of coke per ton of pig iron produced. Given the same ore, an electric furnace would require 0.3 ton of coke per ton of pig iron produced, thus effecting a saving of 0.7 ton of coke per ton of iron. Against this saving in coke must be set the consumption of electrical energy, which averages 0.3 hp.-yr. per ton of iron. This means that, other conditions being equal, the costs of the two systems balance when one horsepower-year can be obtained for the price of 2.3 tons of coke. There are now over 20 electric furnaces working on the manufacture of pig iron, and about 12 more are being installed, which is a good indication of the commercial hold the system is taking. The capacities of these furnaces range from an annual output of 7,000 tons, absorbing 2,500 h.p. and using four electrodes, to 31,000 tons, taking 10,000 h.p. and using 12 electrodes.

Power Consumption for Pig Produced

The power consumption per ton of pig iron produced depends chiefly on the percentage of iron in the ore, on the percentage of CO₂ in the waste gas, and on its temperature. The ideal process would be to burn the whole of the carbon to CO₂, but the reducing value of the gas rapidly decreases as the percentage of CO₂ increases, until a point is reached when reduction ceases. In a good case of 27 per cent CO₂ and 70 per cent iron content, the consumption was only 1,320 kw. hr. per ton. The average obtainable, however, is 22 per cent of CO₂, and with, say, 60 per cent iron content the consumption is about 1,500 kw. hr. per ton.

Electric Steel Refining

Two types of furnaces for steel have been developed, one in which all the electrodes are above the bath, and the other in which the electrodes are both above and below the metal. The first point to observe is that

the resistance between any two upper electrodes is equal to the resistance of two arcs (the resistance of the metal being negligible), whereas the resistance between an upper electrode and a lower electrode is equal to one arc plus the resistance of the hearth. Now, in order that a number of phases may be in balance it is necessary that the resistance in the phases be equal, *e.g.*, if we have a 3-phase furnace system we must have three equal resistances. In the Héroult 3-phase system there are three upper electrodes connected to the outside terminals of three single-phase transformers. In the system the resistance between each pair of phases is equal to that of two arcs, so that the arrangement gives a balanced system when correctly regulated.

An important question is the determination of the number of arcs which should be used in an electric furnace. From a mechanical point of view the fewer the arcs the simpler the system; but the minimum number is determined by metallurgical considerations. There must be sufficient heating zones to melt the raw material rapidly, without necessitating undue exertion in pushing the unmelted metal toward the melting zones, and, in refining, it is imperative that the metal and slag should be brought to a high and uniform temperature. The reason for this uniformly high temperature is that the basicity of the slag depends on its lime content, which fixes its melting point. The higher the content of the lime the higher the melting point, so that the higher the temperature the more possible it is to have a fluid, high basic slag. The extent of the chemical action is indirectly limited by the minimum temperature of the slag, so that in order to get a uniformly high temperature we must have no place in the furnace too far away from an arc, thus necessitating an adequate number of arcs to secure this condition.

Role of Single-Arc Furnaces

Small furnaces have been made having a single arc, but it does not appear that any of these furnaces are in use for refining operations; they are simply employed for melting. It is found that two arcs sufficiently cover a bath up to about 6 tons capacity, and there is no necessity to employ more than two upper electrodes for furnaces up to this size. The main field for these small

2-arc electric furnaces is in small foundries manufacturing better quality castings, such as motor-car parts, etc. The castings made from the electric furnace are superior to those made from small converters, since the metal is thoroughly deoxidized and the sulphur content is reduced to a minimum. These small electric furnaces are also rapidly displacing the ordinary crucible furnaces for the manufacture of higher quality steels.

Melting Ferromanganese

An important use for the small furnace of about half-ton capacity is the melting of ferromanganese for use in conjunction with open-hearth furnaces. When solid ferromanganese is added to molten steel in the ladle, it is only reluctantly absorbed and at least 30 per cent of the manganese content is lost by oxidation. Portions of the manganese are liable to remain unabsorbed by the steel, and these form manganese ghost lines in working, and hard places which appear in machining. Ferromanganese can be melted in a small furnace that has been specially designed for this purpose, and in which the manganese loss is not more than 5 per cent. These small furnaces have a capacity of 10 cwt. and will deliver molten ferromanganese at the rate of 400 lb. per hr. The current consumption is 1,000 kw. hr. per ton of ferromanganese delivered.

Although there are profitable fields for small furnaces, the principal technical developments will take place in larger furnaces. These furnaces may be used either for the complete process of melting, refining and alloying, or may be run in conjunction with Bessemer or open-hearth furnaces to refine the cruder metal from those furnaces. In this case, advantage is simply taken of a feature of the electric furnace—that which permits of working under a non-oxidizing atmosphere at any desired temperature.

Power Consumption

Among the first considerations in any proposal for installing electric furnaces are the available electric power and the price at which it can be obtained. The consumption of current per ton decreases as the size of furnace increases. On a well-designed furnace the power factor is in the neighborhood of 0.8, but it is necessary to have a large reactance, say 10 or 12 per cent in the system to choke the unavoidable fluctuations of current in the arc.

From the electrical standpoint the most severe trial to which the plant can be put is when it is required to melt rough cold scrap and when working on this duty momentary overloads from 50 to 70 per cent may occur, so that the transformers must be designed for such an emergency. The load factor on a single furnace working day and night is about 35 per cent, but when working two furnaces it is 50 per cent, which compares favorably with other loads on electric generating stations. It is unlikely that there will be much decrease in the consumption of current in the steel furnace of the future, since the thermal efficiency of a modern plant is about 65 per cent. Improvements will rather tend toward mechanical reliability and more durable refractories, especially for the roof. The electric furnace is not a cheap melter, its value being in its refining properties. When hot crude metal is charged into the electric furnace the energy and time required for refining is about one-third of that required for melting and refining, so that a furnace charged for hot metal has three times the capacity of one charged with cold stock.

Refractories and Electrodes

With respect to refractories, the electric furnace is practically always lined with a basic hearth, which shows it up to greater advantage in de-sulphurizing. The average life of the roof is 100 heats, melting and refining, or about 400 working hours. During the war, when the cost of refractories was abnormally high, it was found that the average total refractories, including periodic refining, amounted to less than 8s. per ton of metal melted and refined.

One of the most important items in the cost is that of electrodes not only because of their initial cost but

also because of the time lost in renewing them. In the reduction furnace the electrodes are embedded in the loose material. They are not regulated as in the steel furnace, but are pushed down every two or three days as they burn away. In the reduction furnace we are therefore confronted with the problem of requiring an electrode which has a greater conductivity than the carbon electrodes now being used, so as to reduce the contact surface. With carbon electrodes, when working at 40 amperes per sq. in. on the large 28-in. size, we have a voltage drop at each electrode of 20 volts, and about 40 volts in the resistance of the intermediate material, giving a total drop of 80 volts. If we had an electrode which would work at 120 amperes per sq. in., the diameters would only be about 16 in., and the contact area about 500 sq. in., so that the electrode contact drop would be 40 volts, giving a total drop between the electrodes of 120 volts. This would mean that, for the same size of electrodes and the same current, there would be 50 per cent more energy delivered to the furnace. Graphite electrodes will work at a density of 120 amperes per sq. in., but unfortunately they have not been made, up to the present, more than 12 in. in diameter. Electric reduction furnace builders are therefore waiting for the graphite electrode manufacturers to turn out much larger electrodes.

In conclusion it will be seen that both the electric reduction furnace and the steel-refining furnace present interesting problems for electrical engineers and that a fair amount of success has attended their efforts to solve these problems. Experience has shown how important it is that engineers should fully grasp the requirements of the metallurgists and be fully acquainted with the working conditions of blast furnaces and of steel foundries.

Safety in Blast Furnace Operation

The formulation of codes on safety in paper and pulp manufacture and safety in blast furnace operation was tentatively assigned to the National Safety Council by the National Safety Code Committee at its meeting held in Washington Jan. 9.

This committee, which consists of representatives of the National Safety Council, the Bureau of Standards, the Safety Institute of America, the American Society of Mechanical Engineers, the National Electric Light Association, the stock and mutual insurance interests, Underwriters' laboratories, and the State industrial commissions of New York, New Jersey, Pennsylvania, Ohio, Wisconsin and California, also suggested that the National Safety Council undertake the formulation of safety codes on building construction and on power presses. This will be done by the council through its construction and engineering sections and with the assistance of other interested organizations.

The National Safety Council has prepared for its own membership safe practices pamphlets on paper and pulp manufacture, blast furnaces, and power presses, and it is probable that the standards formulated for distribution to industry at large through the National Safety Code Committee will be based on the safe practices pamphlets already issued by the National Safety Council.

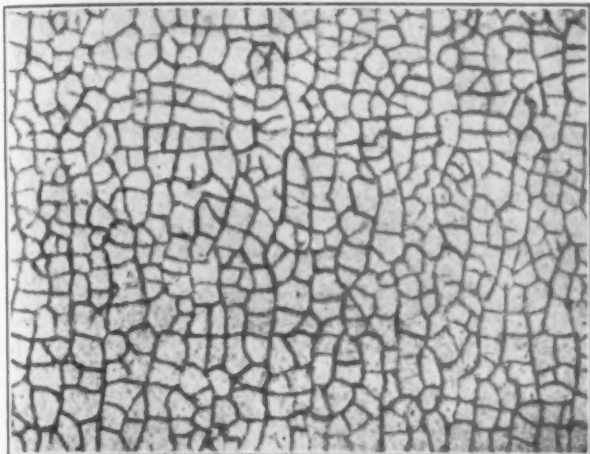
Limestone Companies Consolidated

The entire business of the Bessemer Limestone Co., Youngstown, Ohio, has been taken over by the Bessemer Limestone & Cement Co., organized last summer. The new concern has started the building of a new plant for the manufacture of cement to have a capacity of about 3000 barrels per day. Since the organization of the Bessemer Limestone Co., its plant at Bessemer, Pa., has done a large business in the production of limestone for fluxing purposes, agricultural lime and limestone for other purposes. The officials of the Bessemer Limestone & Cement Co. are: Joseph G. Butler, Jr., chairman of the board of directors; John Tod, president; F. R. Kanengeiser, vice-president and general manager; G. G. Treat, secretary, and J. R. Rowland, treasurer.

A REASON FOR RAIL FAILURES

Effect of Intense Cold Working on Surface Layers—Annealing As a Remedy

A cause for rail failures in France and means for preventing them are discussed in an interesting article in *Genie Civil*, Oct. 18, 1919, by Georges Charpy and Jean Durand. One of the most frequent causes for rail failures in France, outside of local defects, consists in the formation of very fine fissures produced after a certain time on the rolling surface. Several workers have pointed this out and recommended a careful examination of the rails in track and removal of rails showing these fissures. The authors have sought to produce these fissures artificially to see whether



necessary to bring about the fissures is not produced instantaneously, but needs a series of repeated effects bringing about a gradual hardening of the surface. Statistics confirm this view because according to one of the large railroad executives in France, the curve of failures in relation to time in service changes abruptly after about 10 years, after which the number of failures rapidly advances. There seems to be, therefore, a gradual "aging" of rails, and 10 years represents a critical age under the given conditions.

The hardening produced by cold work may be removed at any time by proper annealing. If the annealing is carried out before the fissures are formed the alteration produced is completely removed. The effect of aging is suppressed, and the metal is practically in its original condition. This can be easily tested by means of the ball impression on high speed

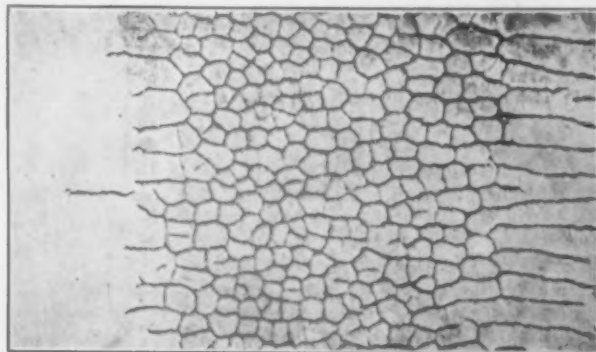


Fig. 1 (Left)—Fissures on the Surface of a Roll After a Short Time in Service. Metal Has Not Been Etched

Fig. 2—Surface of Rail Which Broke in Service. Fissures Are Visible to the Eye, the Steel Having Been But Slightly Etched. Magnification Is Two Diameters

some means could not be developed to prevent or remove them, less costly and more sure than the simple removal of the affected rails.

It was soon found that the phenomenon is very general, and that it exists in a large number of cases where steel is subjected to intense cold working limited to a surface layer. The small cracks are produced when the metal is sufficiently cold worked superficially to break without showing elongation. They are particularly marked with very hard material. For instance, with white iron all that is necessary is rather harsh grinding on an emery wheel. The same result is obtained with high speed tool steel, or with hard chrome-nickel steel or with case-hardened material quenched in water without reheating.

The fissures, often very fine, may be brought out by means of etching. In certain cases it seems as if the acid developed fissures were latent in the metal because previous minute microscopic examination failed to reveal them. Other methods of cold working than grinding give analogous results. For instance, if the surface of very hard steel is subjected to the pressure of a ball, as in the usual way of making a Brinell hardness test, fine fissures can sometimes be seen with the microscope. If the metal is etched, as mentioned above, perfectly clear radial fissures can, however, always be seen.

With steel of the kind generally used for rails in France (95,000 to 100,000 lb. per sq. in.) it is much harder to obtain total superficial cold working. Grinding alone will not produce the fine fissures. Recourse was had to the analogy noticed many years ago by Duguet between the rolling effect of trains and the rolls in the rolling mill. The proof is easier because the rolls are of the same grade of steel. After a certain time in service it is possible to see identically the same fissures in rolls that are found in rails. Fig. 1 shows the small cracks on the surface of a roll, and Fig. 2 the cracks in a rail that broke in service. The same phenomenon has also been seen on the necks of steel rolls. The authors feel that the minute fissures noticed on the interior surfaces of gun tubes after service are a similar phenomenon.

Such results show that, for rail steel, the cold work

steel. If after the imprint is made the metal is annealed, it may be very deeply attacked by acid without the least fissure being seen. In the case of rails, this superficial annealing can be easily carried out by means of heating apparatus mounted on wheels.

By annealing before the critical age of 10 years, it may, therefore, be expected that the failures due to these fissures will be considerably reduced. Without dwelling further on this idea, the general nature of the phenomenon may be again mentioned. In all cases where metal is subjected to alteration by cold working, which develops gradually in service, the effect may be fought by annealing at suitable times, and in this way the life of such materials considerably prolonged.

G. B. W.

The German Minister of Economics is giving earnest consideration to the question of the future of the German Steel Works Union. Contrary to the opinion held by the majority of the works, the government considers that it would be impossible at present to remove all control from the iron and steel industries and markets. The Minister of Economics, therefore, will continue to control prices, and to do so it will be necessary for him to act through some control organization instead of dealing direct with manufacturing and trading units. The government, however, admits that the Stahlwerks Verband cannot continue in its present form, and it is expected that a compromise will be reached by which part of the functions of the Verband will be transferred to the Stahlbund.

The production of petroleum in the United States in 1919 was approximately 376,000,000 bbl., an increase of 20,000,000 bbl. over the production in 1918, according to preliminary estimates made by the United States Geological Survey, Department of the Interior. The stocks of domestic petroleum held by producers and marketing companies at the end of 1919 are estimated at 132,000,000 bbl., an increase of 10,000,000 bbl. over the stocks so held at the end of 1918. The excess of imports over exports in 1919 amounted to approximately 47,000,000 bbl.

DEVELOPING THE EMPLOYEE

Men for Responsible Positions Provided by Training School at Cleveland Plant

A school for employees was recently established by the American Multigraph Co., Cleveland, to bring out and develop the latent abilities of its working force, and to provide an outlet for a man's ambition if he shows any desire to move up from the bench or machine to a position as foreman, chief inspector or to some other place in the administration side of the factory, or to become a member of the sales force or a manager of one of the company's outside service stations. About 200 pupils have already been enrolled in the classes, and the company expects that fully 50 per cent of its 500 employees shortly will be receiving instruction in one or another of the various classes that have been formed. The school is under the direction of the manager of industrial relations, and each class holds a 1-hr. session each week.

In addition to helping the ambitious employee with latent talents to move forward, the company, by training employees, will provide itself with men who are qualified to fill positions of responsibility in its various departments, when such men are needed. The employees will be closely watched, and the company will endeavor to develop men along the lines in which they show ability. The shop representation plan, adopted by this company several months ago and now in very successful operation, is aiding in showing what hidden talents members of the working force possess in that employees who serve on shop committees have an opportunity to develop their initiative and reasoning power. Men who do good work on the committees of the congress that is elected by the employees will be singled out and the company will train them for advancement along the lines for which they appear best fitted.

Course in Advertising and Selling

One of the features of the shop school is a course in advertising and selling, to provide from the shop capable recruits for the sales force and managers of the service departments connected with the various branch offices. Other courses of instruction are in mathematics, foremanship, and mechanical drawing, and a class will be started in English and public speaking.

A shop employee who wants to advance to the service and sales organization secures his admission to this course of instruction through physiological tests that are given to show whether he possesses salesmanship material. If these tests indicate that he is lacking the necessary qualifications to make a salesman, he is not admitted at once to the course, but suggestions are made to him for the development of his weak spots and six months later his case is brought up again. Thus, eliminations are made at the factory rather than waiting until an employee reaches the branch sales office and discovers that while he may be a first-class mechanic and is well qualified for the service department, he still may be lacking in the qualifications that will make him a good salesman. The shop man who takes this course will be given a training for about 1½ years on production work of various kinds until he is finally advanced to a position of final inspector in the assembly department. There will be no prescribed route for him to pass from machine to machine or operation to operation, but it will be the aim to have him do work in as many departments as possible before reaching the assembling department. From final inspection work the men will be sent out in the field on mechanical work in the service or repair department as a last step before reaching the sales force.

Outside of the training that the men receive while being moved through the production department they will be given a course in salesmanship by the assistant sales manager and assistant advertising manager. The salesmanship class meets once a week, and 55 employees are taking the course. Two men have already been promoted from the assembly department to field positions, one being manager, and another an assistant

manager of a branch service station, and one of the branch sales managers has asked for three more men as soon as they receive the necessary training in the shop and class.

Classes in Mathematics

There are three classes in mathematics, one being advanced shop mathematics, which covers elementary engineering and the training of men to estimate costs, and up to the point of doing designing work. Another class is in elementary shop mathematics, which includes teaching the men to read blue prints, taking micrometer measurements, and doing elementary estimating. The third class is in business arithmetic. The latter class was started because of a request from office employees for a course that would give them the training in improved quick methods and for general training for those who wish to become bookkeepers or to advance to other office positions. Some of the factory employees are also taking the business arithmetic course with a view of getting into office work. This indicates a change from the war-time tendency when high wages took many employees from offices to factories. There are 88 pupils taking the mathematical courses, 18 in the advanced class, 30 in the elementary, and 40 in the business arithmetic class.

The mathematical drawing class, with an enrollment of 35, is attended by the employees of the drafting room, apprentice boys, a number of tool makers and some inspectors.

Course in Foremanship

The course in foremanship is given in connection with the industrial extension department of the Cleveland Board of Education, and this is divided into two classes, one composed of foremen and the other of assistant foremen. These classes are given very specific and practical instruction in the art of analyzing men and in handling and instructing men and holding them in the shop. The course consists of lectures, discussions with the men, and the asking of questions on subjects brought out in the lectures. The instructor is a practical man who has come up through the shop. The two classes in foremanship are composed of 24 members.

The classes for the foremen and assistant foremen are held on the company's time from 12 to 1 o'clock directly after the lunch hour, and the other classes from 5.30 to 6.30 P. M. On quitting work at five o'clock on the days the classes are held, the pupils go from their work to the factory restaurant where they are served free with soup, coffee and sandwiches. All classes begin and end promptly, so that there is no uncertainty about the time the men can leave for their homes.

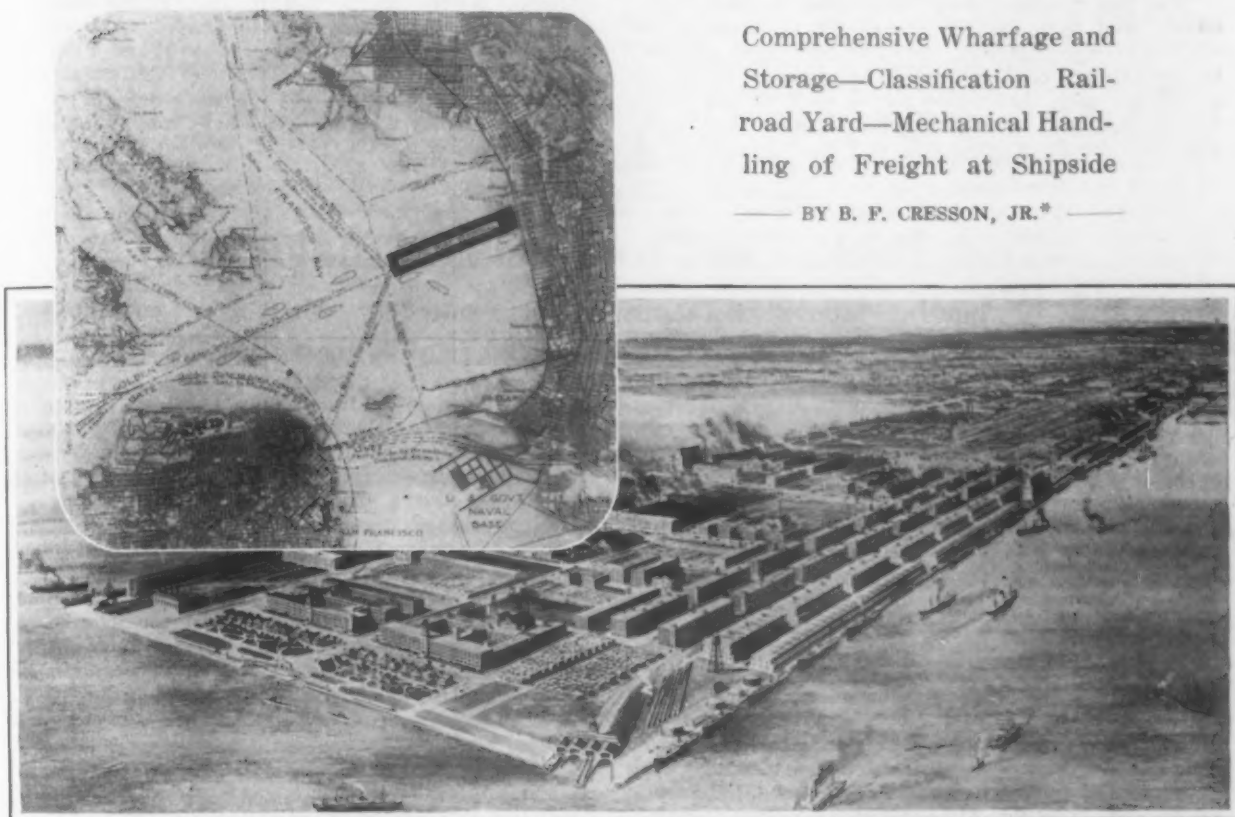
Stimulating Production and Sales

An effective method was recently adopted by the American Multigraph Co. to stir up rivalry between the factory and sales organizations and to stimulate both production and sales. This was in the form of a contest between the two departments, which took place during October. Posters were printed and hung throughout the plant bearing the heading: "Double-Up Month—Bitter Battle Begins Between Super-Salesmen and Pre-eminent Producers." This poster contained the pictures of the various leaders of the production and sales organizations, and of the president of the company, H. C. Osborn, and statements of their respective claims. Each side promised to make a better average record during the month than the other. Additional interest was given to the contest by a close record during the previous month, the sales organization having increased sales 80 per cent over the previous September, and the production department having increased the output 87 per cent over the corresponding month a year ago. Every morning the production for the month up to and including the previous day was posted on blackboards in the factory, and the employees eagerly watched the records from day to day, and the contest not only aroused a great deal of enthusiasm throughout the entire plant, but tended to stimulate production.

Maritime and Industrial Project at San Francisco

Comprehensive Wharfage and
Storage—Classification Rail-
road Yard—Mechanical Hand-
ling of Freight at Shipline

— BY B. F. CRESSON, JR.* —



ONE of the reasons which has retarded more efficient use of machinery for handling freight direct from railroad cars to deep-draught vessels has arisen from the unwillingness of the operator to surrender necessary space which has been not only produced in a very costly manner on piles, but which was also intensively needed for storage. The proposed development of the Pacific Port Terminal at Berkeley, Cal., on San Francisco Bay, is so designed that these difficulties are overcome, and necessary room is created in the most economical manner by hydraulic dredging through pump and fill. In this way land is produced fulfilling the ordinary function of the deck floor in a covered pier.

The plan provides for two railroad tracks adjoining the ship's side, so that semi-port cranes may be operated between ship and wharf shed, and in other places for certain classes of trade the railroad tracks are brought to the rear face of the wharf shed, but leaving space between shed and ship to economically handle cargo and at the same time permit of operation of motor trucks. Track or switching arrangements are such that cars may be taken from and delivered to the nearby classification, holding and delivery yards with no loss of time.

The plan shows harbor works, warehouses and factory developments worked out in an ideal way which will require many years for production in its entirety; but it is arranged, however, so that a beginning may be made along the waterfront immediately, and so that it may in the future be increased gradually upon exact lines by adding units.

It is on account of the necessity for large filled-in areas for development that the plan has been adopted which calls for the creation of the long wharfage face of upwards of two miles on each side of the first unit with a distance of 3000 ft. between, flanked by 3000 ft. of waterway on each side of the wharfage face.

Ample railroad tracks are shown and each warehouse, factory and the public service building has a direct rail approach. At an exterior portion of the quay ferry facilities are provided for railroad car floats, as well as for passenger and vehicular service.

On the southerly side of the outshore end is indicated a coaling station either for bunkering ships or for loading cargo coal, and at this location storage will be provided for oil which may be led through pipes along both faces of the quay so that ships may be supplied with oil while they are loading other commodities.

An area on the inshore end of the quay, with rail track and water connections, is to be available for heavy manufacturing or for plants needing acreage.

An ample railroad yard is shown near the shore end of the quay, and all cars coming to the quay must first pass through this yard. Trains can be brought in from the East, classified and routed for the various industries and storage buildings or to shipping. Provision would be made for classification of commodities coming in mixed cars, also of the freight originating at the terminal either from ships, warehouses or factories. Freight coming to the yard would be classified in so far as possible into car lots and broken up into trains for various railroads. Another holding yard for the carfloat service is located at the outer end.

The wharf shed is two stories, about 100 ft. in width, and designed so that the ground level can be used for commodities passing between drays, railroad cars and ships, and the upper floor for commodities passing between the warehouses and ships. These sheds have sufficient capacity to accumulate the necessary proportion of the cargo in advance of the arrival of the ship, leaving sufficient space for receiving the incoming cargo discharges from the ship.

For the interior movements between wharf sheds and storage buildings, or for movements within either, two types of machinery are recommended: (1) Load carrying storage-battery trucks for the shorter movements; (2) storage-battery tractors and trailers for the longer movements. Conveyors and tiering machinery are useful adjuncts.

Plans for mechanical freight handling contemplate that the storage buildings be equipped on the north and south sides with brackets for whip hoists for taking commodities out of the upper stories of the warehouses and lowering them to platforms along which either railroad tracks run or trucking ways exist; spiral chutes in the warehouses at convenient

*Consulting engineer, 50 Church Street, New York.

points to permit lowering of cargo adapted to this method; within the storage buildings elevators with cage designed to hold two trailers.

For the movements of commodities between warehouses and factories, or ships and factories, or to various service buildings, stores, etc., a system of motor trucks are proposed—a portion of standard make, but a number with detachable bodies so that the bodies can be delivered at certain points loaded with packages for certain destinations and then placed on the

chassis of motor trucks and the packages transported as a unit. This system of motor transportation with removable bodies can be extended when shippers are educated to the point, to through overseas business, and a motor-truck body can be loaded at Berkeley, transported to shipside, loaded aboard and delivered from ship directly to the consignee in foreign port without any breaking of bulk. When a general system has been employed these containers may be utilized in the return trip.

Text Books Used to Educate Employees

American International Corporation and Subsidiaries Prepare
Manual to Assist Workers in Acquiring Useful Business Data

"TO give permanence and authority to information which is ordinarily circulated by memorandum and buried in the files," the International Steel Corporation has developed an interesting series of text books. These books will be used for the education of all new employees and will serve as handy reference in all phases of the business. The library of text books thus far consists of three:

1—Office manual, outlining the principles of the business and setting up standards of operation.

2—Information book, which gives elementary instruction in the various products handled.

3—Catalog containing specific trade information and extra lists.

The office manual gives a great deal of information of a general and specific character, and serves as a guide, to the purposes and personnel of all the companies associated under American International Corporation ownership, gives lists of officers, directors and subsidiary companies, enumerates the various executive functions, and charts the organization plan, giving the functions of all divisions and important positions.

With this general introductory matter the book devotes a good many pages to standard procedure in the handling of communications, including the method of handling incoming and outgoing mail, telegrams and cables, and inter-office communications. Then follows specific information relative to the distribution of communications. In the matter of trade publications, for example, of which more than 20 are regularly read in the departments of the International Steel Corporation, each paper has a well-defined route to travel, this route having been fixed by chart, and each man expected to read a certain publication gets it in due order.

All matters, such as expense accounts, matters relating to corporation policy in general, notices of foreign trade opportunities and many other routine affairs, are listed in such a way that new employees would only have to refer to the manual to know instantly what disposition should be made of any matter pertaining to any phase of the business.

Standard Procedures Are Prescribed

A standard procedure for the routing of inquiries and orders has also been prescribed. Every inquiry has a definite routine, from which there is no variation. It first goes to the sales division, which scrutinizes it carefully, seeking credit information, and ascertaining the desirability of quoting. The sales department makes formal acknowledgment to inquirer and proper file record is made. Then the matter passes to the purchasing department, which assembles information for quotation, showing prices per item f.o.b. mill. The traffic department, at the request of the sales division, names rail and ocean rates; after which the sales division makes up a quotation.

Then follows a period when the inquiry is "in suspense." There are follow-ups at reasonable intervals and new quotations if necessary. If the order is placed the sales division again consults the purchasing division to ascertain if former prices and delivery promises hold good. If so, the order is turned over to the order division with authorization to enter the order for pur-

chase. This part of the office manual gives detailed information as to the functions of each department which in any way handles an inquiry or an order, and also deals with such matters as responsibility for claims, cancellations, extra charges, etc. The purchasing department responsibility, for example, is defined as having ended when material leaves the mill and inland documents are turned over to the traffic department.

There is a chapter in the book devoted exclusively to correspondence standards. To all the details and refinements which many otherwise well-organized companies neglect, the International Steel Corporation has given emphasis. The minute instructions given make it almost impossible for a painstaking stenographer to make an error. What newspapers call "style" the corporation has developed to the nth degree, so that there shall be uniformity and character in every letter that goes forth. Preferred forms of spelling are given, also proper diction; examples are cited of proper and improper use of shall and will. To illustrate the extreme care which the corporation aims to give every letter, a few lines are excerpt from this chapter, of the manual:

"Alike" should not be reinforced by both: "They are (both) alike in this respect."

"Apt" should never be used in place of likely or liable. It means "capable" or "skilled."

"Between" applies only to two persons or things: "Between you three" is wrong.

An interesting feature of the correspondence instruction is the dictum to do away with hackneyed and stereotyped forms, such as: "We beg to advise," "We beg to remain," "We are in receipt of your favor," "Up to the present writing," etc. Better forms are suggested for the guidance of correspondents and stenographers.

Letters Reflect Character of a Business

In closing this chapter the corporation says: "The correspondence that leaves the office of the International Steel Corporation represents the corporation and its policy. Think when you are typing a letter and be sure of its grammatical and physical correctness before it leaves your hands. A well written, neatly typed letter is a credit to the house that sends it out; while a poorly written, slovenly typed letter is a discredit and makes a bad impression."

Another chapter in the manual deals with methods of co-operation between the International Steel Corporation and the other subsidiary companies operating under common ownership. There is a standard procedure for the reporting of results of missions, for the rendering of expense accounts and for ordering supplies and printed matter. There is a chapter on office rules, which gives information on hours of work, holidays, vacation periods, department, salaries, etc. In the matter of promotions every employee is asked to ask himself the following questions should he question the wisdom of any new appointment.

Is it a better position than I now have?

Does it lead in the right direction?

Does it suit my temperament and experience?

Have I learned enough in my present position?

Am I being reserved for something different?

There is a chapter on agency relations, the purpose of which is to outline as fully and clearly as possible the methods of maintaining proper contact and understanding between the home office and representatives abroad. A record of the personnel completes the manual. In this latter chapter are given the names, home addresses and telephone numbers of all of the employees of each division. It frequently happens that one division of the corporation has some business to transact with another division, but the name of the individual to whom the matter should be referred is not known. A great deal of time and unnecessary trouble is avoided by a quick reference to the personnel record, which gives the names of the persons in every department of the various companies. Lists of manufacturers whose lines the companies represent are also given, together with the products they manufacture. Common terms and abbreviations in foreign languages, a convenient method of proving arithmetical calculations, the approximate value of foreign money, the productive capacity of various steel companies, and similar information are also contained in the manual. The work will not stop here, however. Information will be added from time to time as requirements may dictate.

General Information on Steel Products

The books are gotten up in loose leaf form and there is a plentiful supply of extra pages so that where certain information is requested by outsiders it can be given without the effort of writing a special letter—a leaf or two from the manual will supply the required data.

German Metallurgical Expedients with Electrolytic Iron, Copper and Tin

Some of the unusual and unique metallurgical expedients to which the Germans resorted during the war to obtain copper from its alloys and also tin and other metals as well as the substitution of electrolytic iron for copper are recounted for the first time by U. Engelhardt in the *Electrotechnische Zeitschrift*. Extracts are as follows:

The dearth of copper has helped various other metals to the front; that it would also set up an, at least temporarily, important electrolytic-iron industry was hardly to be expected. Artillery trials having demonstrated that electrolytic iron could replace copper as material for the driving bands of shells without putting undue stress upon the guns, three large experimental plants for the manufacture of electrolytic iron were started at Leipzig in the Langbein-Pfanhauser works, in Berlin, by Siemens and Halske A. G., and at Bitterfeld by the Griesheim-Elektron Co. The two companies last named then erected new plants at Munchen and Bitterfeld for 200 tons of electrolytic iron per month; the Bitterfeld plant, however, was not in full working order by the end of the war. The process adopted was that of Langbein-Pfanhauser as further developed by Prof. Fischer, now director of the Coal Research Institute at Muhlheim on the Ruhr; anodes of Martin-iron are electrolyzed in ferrous chloride to which hygroscopic salts are added. Some new electrolytic iron processes, worked out by Siemens and Halske, Schlotter and Estelle were still in the experimental stage at the date of the report, and at present electrolytic iron remains too expensive on the whole.

With respect to copper itself the problem during the war was to obtain a pure copper from the miscellaneous alloys which the mobilization of copper brought in. Several copper refineries were built in Germany and Austria, notably by the Siemens companies. The brass utilized comprised door brasses, candle-sticks, picture frames, taps, crucifixes, etc.; the brass was melted down, the zinc oxidized and the crude copper cast into anodes and treated in the electrolytic refineries.

The requisition of bronzes, largely church bells, followed that of brass. The disintegration of the heavy strong bell metal gave some trouble; the bells were inverted, filled with water and then shattered by exploding cartridges in the water. The bronze was then

The information book is somewhat different in character, giving complete information on all iron and steel products. It starts out with a history of the manufacture of iron and steel and takes up in detail such things as ores, fuel, pig iron, all of the rolled steel products, forgings, castings, alloys and an addenda gives a great deal of miscellaneous information, such as the principles of marine insurance. In connection with the general information on each of the products of the furnace or rolling mill, detailed instructions are provided for the handling of inquiries and orders for any such products, particular attention being given to the saving of unnecessary delays and cable expense.

The three books—the office manual, the information book and the catalog—have already proved of immense value in co-ordinating the various activities of the business, in providing a ready reference for all officers and employees, and in giving instruction to new employees without the great amount of time that would otherwise be expended in drilling each one individually in the way the company conducts its business and its internal affairs. Much of the time that is ordinarily wasted by new employees in asking questions is avoided.

The information book will probably be published in book form for the benefit of the export steel trade.

Morris Metcalf, executive vice-president of the International Steel Corporation, is confident that textbook instruction of employees of all large companies will have an important part in future training of office workers and sales organizations. The work of compiling has been done largely by Wayne Mendell, assistant to the vice-president.

fused into anodes for electrolysis. Engelhardt does not give particulars, but mentions that the accumulation of stannic acid in the anode mud and in the electrolyte disturbed the electrolysis, and that some copper was first lost and recovered contaminated with lead and other impurities; those difficulties were, however, eventually overcome.

The recovery of tin was another difficult problem. Germany possessing hardly any tin ores, the stannic anode mud had to be reduced to tin, and special attention was further paid to the recovery of tin from bearing metal. Two works were built to work up old bushings, and it is said that they have been very successful, and that some works have also managed to economize tin by adopting electrolytic processes in their tin-plating shops.

The Atlas Crucible Steel Products Corporation, Boston, capitalized for \$50,000, has been organized under Massachusetts laws, to deal in carbon, high speed steels, etc. A. H. Hunter is president; H. E. Nichols, treasurer, and Harry West, clerk. The par value of the corporation's stock is \$100. Of the 500 authorized shares, approximately half are held by officers of the corporation. It has secured quarters at 102-104 Purchase Street, Boston, having about 2200 sq. ft. of floor space, for warehouse purposes, which will be open for business Feb. 1. On that date the Boston office of the Atlas Crucible Steel Co. will move to that location from room 535, Rice Building, 10 High Street.

The United States Civil Service Commission announces competitive examinations for foreman, heat treatment of small guns and projectiles at \$12.56 per day; for foreman, 14,000-ton press for armor and large-caliber guns at \$11.84 to \$13.28 a day; foreman heat treatment of small guns, at \$8 a day; all to fill vacancies at the Naval Ordnance Plant, South Charleston, W. Va. Applicants should apply for form 1312 for the first-named position, and form 1371 for the last two positions, stating the title of the examination desired to the secretary of the Fourth Civil Service District, Washington.

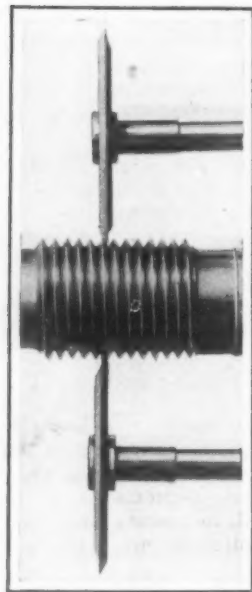
The Central Foundry Co. has let a contract for the extension of its Anniston, Ala., plant by adding a new floor 100 x 200 ft.

Multi-Graduated Grinding Attachments

Several attachments which can be used on a variety of work, but particularly adapted for thread grinding on lathes are being demonstrated by the Precision & Thread Grinder Mfg. Co., 1932 Arch Street, Philadelphia.

The grinder attachment shown in the accompanying illustration is a right-handed attachment for use in front of the lathe center. The wheel truing arm is attached to the base of the grinder in such a way that the thread angle is dressed on the wheel on a plane with the axis of the work centers, thus to produce a perfect formed thread. Positioning pins are provided for quickly locating the angles for V, U. S. and Whitworth threads.

The grinding spindles are carried in ball bearings, adjustable for radial wear and end thrust play, and protected from abrasive dust by felt-lined steel bushings. Lubrication is provided by the spindle housing, which has an oil reservoir. The spindle bearing has take-up adjustments. The spindle housing is indexed with graduations for setting to any angular inclination to conform to the helix angle of the thread. Means are provided for raising and lowering the traverse plate to bring the wheel center into alignment with the work center. The spindle housing is provided with longitudinal feed traverse.



Arrangement of Wheels for Duplex Grinding. This requires the use of right-handed and left-handed attachments, which are placed on opposite sides of the work

or alternating current. The transmission is by endless belt, which travels over a compensating pulley arrangement, which automatically keeps it at the proper tension.

Another model manufactured is a left-handed attachment for use in back of the lathe center. The construction of these two models is identical in all respects with the one exception that they face in opposite directions. Using these two models as a duplex grinder, it is explained, permits of the grinding of a large lot of duplicate pieces rapidly, as after the setting of the wheels on the first piece of the lot, the setting is not disturbed thereafter. With this arrangement the wheels are beveled on one side only, each wheel grinding on opposite sides of the thread and both wheels grinding on the root of the thread simultaneously. This is explained as especially valuable in getting the sharp bottom in a V form of thread. As there is no included angle point to wear away, the wheels do not require redressing, the effect being the same as flat grinding with a straight wheel. This method of using the two models is explained as making it possible commercially to obtain the same precision on duplex thread surfaces as is now obtained on cylindrical, flat and thread surfaces.

In the Youngstown, Ohio, district the sum of \$80,720,946 was distributed in wages in 1919 by industrial corporations, principally iron and steel companies, according to computation by banks. This was the largest distribution of any year except 1918, when the consolidated payroll aggregated \$84,393,688. The December payroll was \$6,631,413. The largest wage disbursement was in January, when \$8,526,491 was paid to workers.

MACHINE TOOL SALES

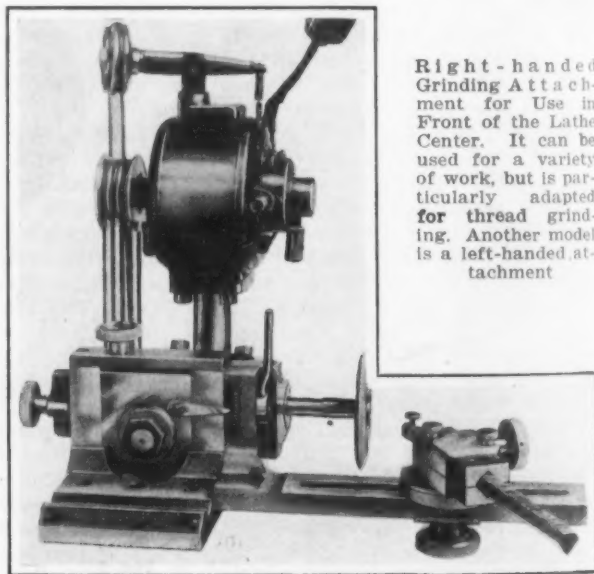
Belgians Not Pleased—Report on Transactions for Past Year

WASHINGTON, Jan. 27.—Members of the French Commission which will make selections of machine tools from the War Department surplus will arrive in Washington this week. The French Government, under contract arranged by the War Department representatives several months ago, will take \$25,000,000 worth of army surplus machine tools in this country for resale to French manufacturers.

The commission is made up of ten persons, who, it is expected, will remain in the United States for several months.

Lieut. Jean Jean, who has been representing Belgian manufacturers in arrangements for the purchase of machine tools in this country, plans to return to Belgium. Lieut. Jean Jean has been disappointed in the lack of response from American manufacturers who were notified in a circular sent out by the Director of Sales of the War Department to make bids on about \$2,000,000 worth of machine tools desired by the Belgians, which the War Department was unable to supply. Only two offers were made as a result of the War Department circular and in these cases amounts added for commission for foreign agents caused the Belgian representative to view them with disfavor. The War Department officials who have had a hand in the transaction also express displeasure at the failure of the American manufacturers to make offers which could be accepted by the Belgians. It is the belief of the War Department officials that the Belgians, after purchasing such machine tools as have been selected from the War Department's surplus, will buy the rest of the tools in Germany. While the German products will not be fully up to those obtained in the United States, exchange conditions are such as to give the German manufacturers an advantage.

Lieut. Jean Jean was not authorized to make any actual purchases while in this country, but will make



Right-handed Grinding Attachment for Use in Front of the Lathe Center. It can be used for a variety of work, but is particularly adapted for thread grinding. Another model is a left-handed attachment

a full report of the situation when he returns to his country.

The total sales of machine tools during the year 1919, according to a chart issued by the department, amounted to \$4,979,633.84, which represented a recovery of 59 per cent of the cost price. Included in this total were sales amounting to \$1,851,437.83 by the Aircraft Bureau, \$18,022 by the Chemical Warfare Service, \$11,247.14 by the Construction Division, \$2,047.50 by the Signal Corps, \$2,824,874 by the Ordnance Department, and \$272,004.93 by the Surplus Property Division. The total sales of all commodities for the year 1919 by the Office of the Director of Sales amounted to \$552,748,555.69, an average recovery of 73 per cent of the cost price.

Pig Iron from Scrap in Electric Furnaces

French Methods and Experience in Synthetic Cast Iron During the War—Economic Aspects—New Plants Operated

LARGE quantities of synthetic cast iron or pig iron made from steel turnings in an electric furnace were made in France during the war. This iron was used for making shells and other purposes where high-grade iron was necessary. The process used was that of Charles A. Keller, who described his methods and the works in which they were carried out in a paper, "Synthetic Cast Iron," presented before the fall meeting of the Iron and Steel Institute in London last September. An abstract follows:

The novelty of the manufacture of synthetic cast iron consists in carburizing iron and steel scrap, and more particularly turnings, by melting these materials in the presence of carbon, which is introduced simultaneously with them in the melting appliance. The electric furnace is plainly indicated as best fulfilling all the conditions required for the carrying out of this metallurgical operation.

In an electric furnace charged with steel turnings mixed with carbon the carburization is not only absolutely controlled by the known reactions of the substances present but, it should be noted as an important economic advantage, that the combination of the carbon with the iron begins in the upper parts of the charge, long before actual fusion. Cementation intervenes from a temperature of 650 deg. upward and becomes more rapid in proportion as the temperature rises, owing to the descent of the charge.

Carburization of the iron takes place subsequently, by the contact between the solid carbon and the partially carburized metal in the course of melting, and becomes complete on full melting, the temperature of which is determined by the nature of the iron, so that casts can readily be obtained in the electric furnace at temperatures of 1200 to 1300 deg. C.

The mixture of steel turnings and carbon possessing, in itself, very high conductivity, the introduction of basic slag into the charge lowers the conductivity of the mass to be treated by the introduction of a non-conducting material among the conductive materials (turnings and carbon), thus enabling fusion to take place under ordinary thermo-electric conditions, and brings about complete and easy desulphurization of the resulting metal.

The iron obtained in the presence of a sufficiently basic slag, which combines with the small amount of silica introduced, will contain practically all the substances contained in the charge, except the sulphur. There will be no increase in the silicon, and the carbon in the charge will be used up solely in carburization, without any appreciable intervention of the silica. Hence control of the percentages of silicon and of other elements becomes easy; for example, extra silicon will result from introducing more silica into the charge, along with a corresponding amount of carbon for reducing it. The percentage of silica in the slag will vary according to the percentage of silicon in the iron. Control of the composition of the slag must be strictly exercised and the amount of carbon introduced must be accurately known.

Economic Aspects

The electric furnace, fed continuously by the charge, works regularly and with very small losses. This enables the consumption of electrical energy to be reduced to as little as 675 kw.-hr. per ton of pig in a 2500-kw. furnace of 80 to 100 tons. Maintenance of a furnace, working in the manner described, is barely appreciable. In a six months' campaign at Livet the above furnace did not require any repairs either to linings, shell, or any other part. The lining only needed some attention when the furnace was put out of action

owing to the water power supply failing. The electrode consumption can be lowered to 6 kg. per ton, with electrodes of good quality. The consumption of unoxidized turnings is 1050 kg. per ton of iron and even with moderately rusty scrap becomes only a little over 1100 kg. The amount of coke with 80 per cent fixed carbon required to produce a ton of strong pig iron with 3 per cent of carbon and 1.75 per cent of silicon, starting with normal turnings of shell steel, is about 80 kg.

While synthetic iron found a wide field of application during the war, owing to the very large production of steel turnings derived more particularly from shell manufacture, it will find no less a field after the war in, for example, producing those steel-like qualities of material required for highly resistant mechanical parts. The most obvious plan to adopt is to lay down a foundry for such parts adjacent to the synthetic cast iron plant, as has been done at Livet. In such a case the foundry iron from the primary furnace may, if preferred, be made use of by transferring it to an electric mixer which can mix several casts and thus keep any quantity of metal ready for casting.

The manufacture of malleable cast iron is likewise easily accomplished in the electric furnace and synthetic cast iron may find a further field of application in the manufacture of special pig, by means of special additions, such, for example, as nickel, chromium, etc. In such cases benefit will be derived, in making this kind of iron, from the absence of hydrogen, nitrogen, carbonic oxides and occluded air.

Dephosphorization

The metallurgical value of the results obtained by the process alter completely when it becomes a question of dephosphorization, which the author has practically accomplished by means of a dual process.

The turnings are melted in the presence of a small quantity of carbon and of a basic oxidizing slag. It is necessary to aim at a critical carburization which must be as high as possible, in order to lower the temperature of working and to facilitate the casting of the metal, at the same time effecting dephosphorization. A percentage of 1 or slightly over realizes this object.

This first-stage dephosphorized metal, containing low percentages of silicon and manganese, is, according to circumstances, either cast into small ingots which are subsequently melted in an open furnace, mixed with the necessary additions of carbon and a desulphurizing slag containing exceedingly little phosphorus, or else poured into a second furnace of the bricked-in type, and covered with a layer of anthracite for recarburizing. The synthetic cast iron produced is controlled in respect of its silicon and manganese percentages by the addition of oxides and of a corresponding amount of reducing carbon.

This mode of working somewhat increases the cost of production during the first phase, and further necessitates, in the second phase, a converting-cost equivalent to that of manufacturing ordinary synthetic iron. About 1500 kw.-hr. must be allowed for the two operations.

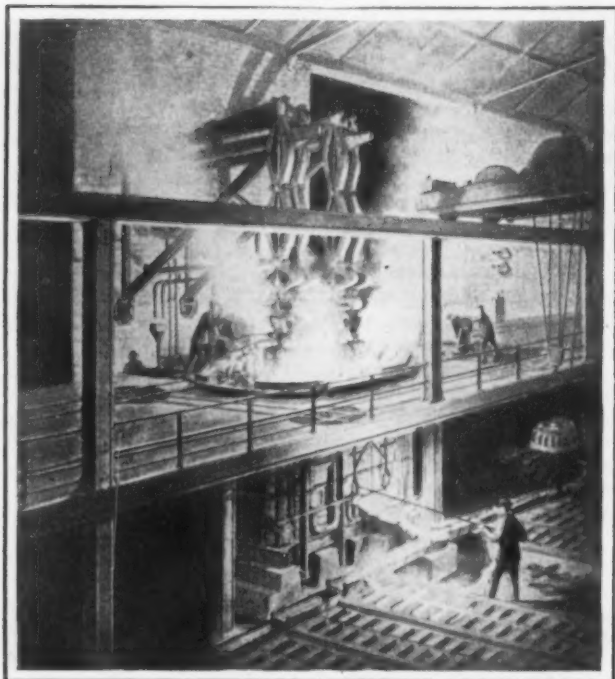
The higher costs of manufacture are balanced by the higher value conferred on the synthetic cast iron by reason of its extreme purity in regard to phosphorus, its purity as to sulphur and its uniform composition in respect of silicon and manganese. Commercially such material can compete with Swedish iron.

Works in Operation and Output

During the war the production of synthetic cast iron exceeded 150,000 tons at the three works administered by the Keller Leleux Co. at Livet, Nanterre

and Limoges. At Livet the manufacture of 220-mm. shells of synthetic semi-steel was undertaken on a commercial scale from the beginning of 1915. The daily production at first was at the rate of 50 shells, but in 1916 was raised to 300 220-mm. shells and 10 high-explosive 400-mm. shells, requiring 55,000 kg. of raw material. New works laid down in November, 1915, a few hundred yards from the original works, were started in July, 1916. They contain five Keller furnaces of the electrodes in series type arranged in line, four being of 2000 kw. and one of 2500 kw. Their capacity is 300 tons of synthetic iron a day, but this output could not be maintained owing to circumstances which, however, were quite independent of the plant itself. In these works the incoming steel turnings are handled by means of an electromagnet suspended from a high-speed crane, and if not required at once are stocked in a deep trench along part of the shop, from which they are withdrawn by the same means. A 12-ton car can be unloaded in 20 min. The loading of the finished iron into cars is also effected by an electromagnet suspended from an overhead electric crane which serves a railroad line parallel with the front of the electric furnaces. A 10-ton car can be loaded in 15 min.

At the end of 1916 the author was authorized to lay down and equip, at the expense of the State, works at Nanterre for a daily output of 300 tons of synthetic cast iron, the power being obtained from the Societe d'Energie Electrique de la Region Parisienne. These works contain seven furnaces, six of which are in operation, requiring 10,000 kw. They were built in 182



One of the Large Keller Electric Furnaces Making Pig Iron from Steel Scrap in One of the Large French Plants. The scrap is charged in on the upper platform and the synthetic iron tapped in a pig bed on the lower level

effective working days, and were put into operation in July, 1917. The consumption of material per ton of pig in the 1650-kw. type of furnace installed was: Steel turnings, 1133 kg.; coke, 89.95 kg, and electrodes, 6.1 kg., with 815 kw.-hr.

The works at Limoges utilize the surplus power developed at the Eymoutiers hydroelectric works, and the electric furnace, of 1000 kw., was in 1916 worked in parallel with the tramway system, an arrangement which practice has shown to be advantageous. A similar plant, with a power capacity of 2000 kw., has been laid down by the Keller Leleux Co. at Villefranche to use the surplus power developed by the Midi company on its line from Perpignan to Bourg-Madame. It has only just been completed.

The rapid extension of the use of synthetic cast iron led the Keller Leleux Co. not only to lay down

new works, but also to increase the power resources at Livet. In August, 1917, works were undertaken in connection with the Vernes fall on the river Romanche, and the new hydroelectric station was brought into operation in the following July. The nominal power is 7000 hp., the fall being 20½ m. The hydraulic works include a subterranean canal, 208 m. long, under the Livet works; a tunnel, 620 m. long, in the mountain, and a reinforced concrete conduit, 3.6 m. in diameter and 132 m. long. Two steel conduits, 2.5 m. in diameter, feed the 3500-hp. turbines in the powerhouse. The additional power thus developed corresponds to an increase in the output of synthetic cast iron of 25,000 tons a year.

Toward the end of 1917 the company undertook the harnessing of the Baton fall, 1100 m. high, and yielding 7000 hp. It is expected that the operations will be completed this year, though the tunnel, 1050 m. long and at an altitude of 1900 m., by which the water is led to the works, still remains to be completed. A conduit, of a total weight of 400 tons, which will have to be clamped to the steep mountain side for a length of 1600 m., has also to be finished.

Bonus Plan for Engineering Staffs

A joint plan for participation in management and bonus payment aimed to reward deserving employees in an engineering office who are contributing substantially to the success of the business, has been put in effect by Cundall, Powell & Mosher, Inc., 80 West Genesee Street, Buffalo, which maintains general engineering offices, having departments in charge of specialists and dealing with various branches of industrial engineering.

Inasmuch as the stock of the company had all been issued and it was deemed inadvisable to increase the capitalization, there was created an associate membership carrying with it the right of participation on an equal basis with the board of directors in all affairs of management not directly connected with the finances of the company. The selection of the men comprising this associate membership is determined by the board of directors and is intended to give recognition to men whose work directly affects the profits and well-being of the company.

There were prepared certificates of membership in shares of \$100 each. To each associate membership was given \$1000 worth of these certificates, together with an additional \$100 certificate for each continuous year of service with the company. These certificates are non-transferable, are not negotiable and automatically revert back to the company should a member for any reason leave the service of the company. It is proposed to establish a sinking fund for the purpose of redemption of the certificates in this latter case.

A standard of annual fixed charges which also includes 10 per cent dividends on the capital stock has been established, and when earnings are sufficient to absorb these charges, together with current running expenses, the surplus over and above this amount will be divided equally between the stockholders on the one hand and the holders of the participation certificates on the other, in accordance with their holdings.

In order to give recognition to length of service a \$100 certificate is given all employees for each continuous year of service with the company. These certificates share on a pro rata basis in the division of profits but do not entitle the holder to any share in the management. By this arrangement it thus becomes possible to give a form of reward for length of service, and even though a member has not the ability or training to permit his being elevated to the associate membership class, yet he will possess a continually increasing amount of certificates and a corresponding share in the profits.

Extensive additions to its strip mill capacity are being made by the Trumbull Steel Co. at Warren, Ohio. A hot strip mill, 100 x 1200 ft., is under construction and will produce steel for auto brake bands and automobile parts. The existing strip mill buildings will be enlarged for additional installations.

TUNGSTENLESS TOOL STEEL

British Views of the Recent Claims—Vanadium and Cobalt as Stabilizers of Molybdenum

In *THE IRON AGE*, Jan. 1 and 8, 1920, comments of American metallurgists were published on the "new super high speed steel," supposed to have been discovered by Professor Arnold, which was first sensationally called attention to by the London *Daily Mail*. The interesting editorial comment of the London *Ironmonger* of Dec. 27, on this subject, is given in part as follows:

The stunt story published by the *Daily Mail* last week of the discovery of a new high-speed steel by Dr. Arnold, of Sheffield, with its characteristic background of government intrigue and "hidden hands," was even more fanciful than the usual type of sensational tale in which that journal specializes. The element of fact behind the hullabaloo has been exaggerated and distorted to the point of absurdity, much to the annoyance, we understand, of Dr. Arnold himself. There is no remarkable new steel to reveal to the public, no government plot, and no "consternation" among Sheffield steel manufacturers over impending revolutionary changes in the tool steel industry. All that is merely *Daily Mail* epileptics.

The use of molybdenum in high-speed steel manufacture, as everybody in the steel trade knows, is not new. Molybdenum has been so used in this and in other countries for several years, but while steel makers have been aware of its property of increasing the cutting power of steel there have always been difficulties in its application, chiefly on account of its unreliable behavior in association with the other elements present and the instability of the crystalline systems set up in the heat treatment. Consequently, the more reliable, if somewhat less efficient, tungsten was preferred. The new steel is only a development of a discovery made by Dr. Arnold as long ago as 1899 that the cutting power and the stability of the then best high-speed steel (essentially a tungsten steel) were greatly increased by the introduction of about 1 per cent of vanadium. While following up this discovery during the war Dr. Arnold found that by substituting about 6 per cent of molybdenum for the 18 per cent of tungsten usually employed and retaining vanadium to the extent of about 1¼ per cent the efficiency of the resulting steel was increased by approximately 10 per cent and its stability ensured.

This, broadly, is the extent of Dr. Arnold's discovery at the present time. The discovery was made in 1918, and the facts were embodied in a paper submitted to the Iron and Steel Institute at its May meeting in 1919, under the deliberately vague title "The Molecular Constitutions of High-Speed Tool Steels and their Correlations with Lathe Efficiencies."

Previous to the publication of the results Dr. Arnold made application for provisional protection for his discovery, claiming patent rights for the use of molybdenum in place of the tungsten in high-speed tool steels. But when the facts came to the notice of the Army Council and other government authorities Dr. Arnold was prohibited from carrying the matter further and from disclosing details of his discovery, lest the information should afford assistance to the enemy. This action was reasonable and strictly in accordance with government policy, and Dr. Arnold did not consider himself aggrieved by it. Early in 1919 he had a severe breakdown in health, and was ordered nine months' complete rest. During this time he was unable to follow up his application for patent rights, and he did not resume professional work until two or three weeks ago. The suggestion conveyed in the *Daily Mail* that Dr. Arnold was victimized by the government in the interests of tungsten steel manufacturers has no justification, and Dr. Arnold has recently been advised officially that he is free to proceed with his invention, and may take any measures which will give him complete patent rights.

The use of molybdenum in steel manufacture has for a long time been much more warmly advocated in America than in this country, in view not only of its hardening properties, but also of its value in manufactures requiring special heat treatment. It is believed that in attempting to establish proprietary rights either at home or in America Dr. Arnold will encounter powerful opposition. The future of Dr. Arnold's steel is therefore very largely bound up with the future of the world's molybdenum and vanadium supplies. There are probably large deposits of molybdenum yet untapped in Australia, in North and South America, and in Europe. Vanadium ores are by no means so widely distributed, by far the most important deposits being found in South America, and these have lately been acquired by a powerful syndicate in the United States.

In a communication to the Yorkshire (England) *Post*, Darwin & Milner, Ltd., Sybry, Searls & Co., Ltd., and the Spartan Steel Co., all of Sheffield, wrote in part as follows:

We fully endorse Dr. Arnold's view that molybdenum in high-speed steel produces far better results than tungsten. We must, however, dispute his claim that his formula is new, and also that vanadium has proved an efficient stabilizer of molybdenum when used with it. Not long after the introduction of tungsten high-speed steel, molybdenum high-speed steel, both with and without vanadium, was made in the United Kingdom, France, Germany, Luxembourg, Austria, and the United States, similar to the formula which Dr. Arnold has now made public. The occasional startling results of such molybdenum mixtures induced many firms to plunge into schemes for producing molybdenum steels on an extensive scale, but all had to be abandoned, because the resulting product lacked uniformity. Much of it was of excellent quality, but, on the other hand, batches of tools failed entirely, although they showed the correct analysis. In the cases where vanadium was added, it failed to be uniform in bulk manufacture, just the same as the molybdenum steel without vanadium, consequently the makers fell back upon tungsten.

We attribute Dr. Arnold's erroneous faith in vanadium as a stabilizer to molybdenum steel to the circumstance that he experimented merely on small quantities. However, only bulk production can disclose the presence or otherwise of a real stabilizing element. P. R. Kuehnrich, of Sheffield, made the discovery that cobalt acted as a definite stabilizer to molybdenum, and he patented a formula to this effect.

As the licensees under that patent, we have made and distributed hundreds of tons of the Como brand molybdenum super high-speed steel, and completely proved that cobalt is de facto a stabilizer.

Chain Company Buys Rotary Bushelers

The purchase of the bar iron mills of the Highland Iron & Steel Co. at Terre Haute, Ind., and West Pullman, Ill., by the American Chain Co., as announced in *THE IRON AGE* last week, was made because the city of Columbus had confiscated the American Chain Co.'s rolling mill in that city in the interest of the city's improvement schedule, leaving the company without iron-making facilities.

The purchase, which was dated Jan. 1, carries with it the control of the rotary method of busheling scrap, which was described in *THE IRON AGE* of Nov. 27, 1919. The total capacity of both mills is 100,000 tons yearly. The bar iron will be used for fabricating into ship anchor and dredge chain at the company's plants at Columbus and Braddock, Pa.

The new officers of the Highland Iron & Steel Co. are: President, W. B. Lashar; vice-presidents, W. T. Morris and Wallace C. Ely; treasurer, Wilmot F. Wheeler.

German Price of Zinc

At the forthcoming meeting of the German Spelter Syndicate it will be proposed to advance the prices, in order to bring the Syndicate quotation (which is now 450 m.) closer to the prices ruling in the open market, says the London *Ironmonger* of Jan. 3. The Spelter Syndicate has been renewed for three months.

Manganese Ore from the Caucasus

The approximate quantity of manganese ore shipped from Batoum and Poti since the Black Sea was reopened to trade is put at 25,000 tons. Of this quantity about two-thirds have gone to the United Kingdom and one-third to American ports.

C. H. Markham, president of the Illinois Central Railroad, at the annual meeting of the Southern Hardwood Traffic Association at Memphis, Tenn., held last week, declared that 700,000 additional freight cars will be required by American railroads during the next five years to meet the traffic needs of the nation.

Recently the employees of the Sharon, Pa., works of the American Sheet & Tin Plate Co. presented Joseph T. Dougherty, superintendent of the plant, an automobile.

IMMENSE DEPOSITS

Unlimited Raw Material of Mesaba Iron Co.— Interesting Facts About the Plans

Further information relative to the plans of the newly organized Mesaba Iron Co., announcement of which was made in THE IRON AGE Jan. 15, is now available.

Construction of a works to have capacity for about 4000 tons per day of rock has begun; this is situated on the eastern end of the Mesaba range, some 12 miles east of the point where the Duluth & Iron Range Railroad crosses the range, on its way to the Vermillion. There is a branch line of the road to the site, built some years ago as a logging spur, and from this a short track to the millsite is now being laid. A small town is under construction to house the workmen employed in erecting the works and for those who will later be engaged in its operation. These houses are of wood, though it is expected that later all construction will be of steel and concrete. The mill will supply a large amount of crushed rock as a byproduct, which can be utilized in this construction. The present works will cost \$3,000,000, which sum has been paid in by the stockholders in the company.

It is understood that the degree of concentration is about two and one-half tons into one of ore, so that a crude rock capacity for 4000 tons will give about 1600 tons of 65 per cent ore daily, or about 480,000 tons a year. It is designed that the works shall operate continuously through the year, as do many other wet concentration plants in the North, both in America and elsewhere. In addition to this will be a production of crushed rock suitable for concrete to about the same total, with a fine sand residue of tailings.

Will Have Quarries

These works will consist of quarries, delivery to mill by heavy duty lines, successive breaking with the separation at each step of the rock containing no iron or too little iron to be economically saved, fine grinding in ball mills, magnetic separation and sintering for final product. The coarse crushing will be by jaw and other crushers and by rolls. The ball mills used in the original experimental works at Duluth were of the Hardinge type, and it is said that this class of mills will be installed in the larger works now building. Experiments in sintering have been in machines of the Dwight-Lloyd type, possibly with some modifications, and the magnetic separation has been in a Davis log washer separator, invented by E. S. Davis of Minnesota, who has been connected with the Mesaba enterprise for some years in an engineering capacity. This machine combines the advantages of the log washer and the magnetic separator, is cheaply built, efficient, economical of power and of large capacity. The sintered product is a sort of clinker, as porous as coke, as hard as rock ore and dust free. Furnacemen who have tried it are well pleased and think it a distinct advance in blast furnace charge.

Demand for Crushed Rock

There is a heavy demand in Minnesota for crushed rock for concrete roads, that State having undertaken a hard surfaced highway project that is more ambitious than any elsewhere in contemplation, anticipating the expenditure of not less than \$10,000,000 a year for many years. It is said that, contrary to what might be supposed, the available quantity existing in Minnesota of either crushed rock or of gravel suitable for concrete is not large.

Figures have been printed to the effect that the ultimate intended expenditure of the Mesaba Iron Co. for works was \$30,000,000. This is denied. There is no ultimate sum set. But it is probable that the financial interests behind this project will make such investment in works, from time to time, as may be advisable; this may be less or more than the \$30,000,000 mentioned in dispatches.

The announcement printed in THE IRON AGE Jan. 15 contained this paragraph:

The quantity of raw material controlled by the company, the commercial and competitive value of which has been satisfactorily proven, may be described as practically unlimited, at least from the viewpoint of the succeeding generation.

That this statement is an example of remarkable conservatism is very evident from a prior statement made over the signature of D. C. Jackling, the managing director of the experiments in this ore and the president of the Mesaba Iron Co. He said under date of Nov. 5, 1919:

The quantities of raw material thus controlled may be described as unlimited for all practical considerations. A single square mile, which has been thoroughly drilled to a depth of 50 ft. only, contains about 110,000,000 tons of average grade rock within that depth. There is doubtless the equivalent of at least 10 square miles of similar material in the 24 square miles of property controlled by the syndicate, and it is known that the average thickness of workable grade is much greater than 50 ft., and accordingly no question can be raised as to the magnitude and advantageous location, both economically and physically, of these deposits, the good quality of which has also been demonstrated conclusively over wide areas.

The same statement has this to say as to the future capacity of the works:

After the first concentrating section is operating smoothly, it is proposed to add other units, thus balancing the 4400-ton coarse crushing installation, and it is expected that rapidly thereafter the plant will be increased to a capacity of at least 10,000 tons per day, and probably to a much greater one.

Has Large Acreage

The company owns or controls about 15,000 acres in the east Mesaba district and a considerable further acreage elsewhere, also containing a magnetic ore suitable for the production of a low phosphorus product. Part of the Mesaba property is what was at one time known as that of the Mesaba Iron Co., a concern organized soon after the Civil War, and antedating by many years any other iron mining corporation in Minnesota. It was then supposed, and thereafter until this present company attacked the situation with its eye single to the concentration of vast bodies of low grade material, that there existed in this area natural concentrations of high grade iron ore similar to what was later found to exist on other parts of the Mesaba range. Many explorations were carried on in various portions of this tract looking for such ore bodies, but always without success. The thousands of exposures of glistening, steel-like ore scattered for miles over this property gave rise to this belief, but these exposures were thin bands of the formation, weathered or eroded to the hard, high grade, thin seams. The entire deposit is of this banded character, these bands being at a dip with the general dip of the formation, and it is this banded nature that permits successive concentration and the gradual elimination of silica until the more expensive fine grinding takes place on a high grade crude and leaves a product suitable for sale as crushed rock. Mining will be done by hard rock quarry methods, and practically without stripping.

Work of Pittsburgh Experiment Station

A joint meeting of Boston sections of the American Society of Mechanical Engineers and the American Society of Heating and Ventilating Engineers was held at the Engineers' Club, Boston, on the evening of Jan. 22, about 75 members and guests attending.

A. S. Kellogg introduced as the first speaker of the evening John R. Allen, vice-president A. S. M. E., director of research laboratory American Society of Heating and Ventilating Engineers, United States Bureau of Mines, Experiment Station, Pittsburgh, who gave a highly interesting talk on what the Pittsburgh Experiment Station hoped to accomplish and what it was doing toward the establishment of standards in heating and ventilating. E. H. Colpitts, assistant chief engineer Western Electric Co., read a paper on the needs of research work in this country and pointed out ways in which it could be helpful and harmful.

Industrial Relations

Their Importance

Short Talks on Vital Questions by One
of Experience

"Sufficient unto the day is the evil thereof." This statement, often quoted and too often followed, expresses the attitude of many leaders of industry toward their labor problems. Disagreements, walkouts, and strikes with their consequent evils, costly evils too, are met when they arise and are overcome in the course of least resistance. Once conditions become settled and tranquility reigns again, the whole difficulty passes out of mind and into history to be recalled only as an incident. If in the future the horizon becomes cloudy and new problems arise, they are met as heretofore. That such affairs are expensive financially is too obvious for mention.

The best efforts of any company through its directors and officers are brought to bear on the various phases of its business and we see financial arrangements carefully drawn; purchasing done according to a definite program and to the best advantage; in sales extension and management clever minds are enlisted; and trained men put forth their diligence on production methods prepared with deep thought backed by a wealth of experience—all of these are handled with assiduity; but the workers who are to be the final link in this carefully wrought chain—they are treated as a commodity subject to the law of supply and demand, whose hands are to be rented through the best bargain obtainable by the least intelligent of the supervisory force, the foreman. Clear thinkers are changing this, however. During recent months these problems through their magnitude and frequency of recurrence have been receiving the serious thought of aggressive industrial executives. They have come to realize the true importance of this man problem and to see its human aspects. They have somehow sensed its true relation to finance, sales and production affairs. They know how the financial world considers a company with a reputation for no labor disturbances and that this is one vital factor in determining the value of its securities.

In the last analysis, the strength of a company is measured by the money it can collect for goods produced and sold in uninterrupted succession. If the production function is halted through a labor difficulty, the program is not only upset but there follows an unwarranted drain on the financial reserves. It is commonly said that labor is the most important question confronting the industrial world to-day. Quite true. Yet, is it any greater than financial, sales or production problems? Is any one link in a chain more important than its fellows? Have not events during and since the World War thrust this labor problem to the fore and magnified it because of the utter lack of consideration previously afforded? Is it not true that the worker is going about his task with leaden feet and heavy hands relieved only temporarily by the frequently recurring wage increases when the answer requires that together with the fair wage (and fair only) must come an interest in his work that will give him a vision of his job—a vision that will quicken

This is the first of a series of short talks on Industrial Relations by Thomas Stanion, director of safety, Aluminum Manufacturers, Inc., Cleveland, formerly the Aluminum Castings Co. This is an introductory chapter. The others will discuss important phases of the problems of modern industry in an interesting, practical way.

these feet and hands into the loyal worker? Such must and can be done if management will live this belief in the new day of relation between worker and employer.

A paragraph in *THE IRON AGE*, Jan. 22, states that the standardization committee of the National Association of Purchasing Agents has been unable to agree on a recommendation of one size for all catalogs. This was an error. At the Catalog convention, May, 1918, at the Hotel La Salle, Chicago, attended by printers, paper manufacturers, catalog makers and trade organizations, three sizes were agreed upon. The standardization committee of the National Association of Purchasing Agents immediately went into session and adopted the single size of 7½ x 10% in. This was officially ratified at the September, 1918 convention of the association held in Detroit. The association has consistently advocated only this one size as a standard, previous to and since the Chicago convention.

A continuous duplex method of making high-grade steel from steel scrap has been patented (U. S. 1,316,724) by Charles A. Keller, Paris, France. He uses an open-top shaft furnace with a non-carburizing lining, charging the iron continuously as it settles below the top. With the iron he charges granulated basic slag for desulphurizing, and enough carbonaceous material to reduce any iron oxide present with a surplus to make a fluid high-carbon steel, easily tapped from the furnace. This molten material is then transferred to a closed electric or open-hearth furnace, and held under an oxidizing slag, whereby the carbon is reduced to the required amount. Dephosphorization proceeds simultaneously in this refining furnace.

Possibilities of the oxy-acetylene process in heavy welding is the subject of an illustrated article by James G. Hill, manager Great Lakes Welding Co., Cleveland, presented before the International Acetylene Association, July, 1919, and now reprinted in the January issue of *Autogenous Welding*, the quarterly publication of the Davis-Bournonville Co., Jersey City, N. J. The importance of selecting the proper welding rods for cast iron is emphasized by C. L. Brand, manager supply department, Davis-Bournonville Co., in an article in the same issue.

Julius Kahn, president of the Truscon Steel Co., Youngstown, O., announces that a plan of common stock subscription has been put into effect whereby employees may purchase such stock up to 10 per cent of the income they received from the company during the past year, at \$20 per share. Its present market value is \$30. Payments may be spread over a period of two years, divided into equal semi-monthly installments deducted from the employee's pay envelope. On deferred payments 5 per cent interest is charged.

The Marshall Furnace, Newport, Pa., resumed operations Jan. 23. Resumption of operation, after a shut down in the early spring, had been scheduled for several weeks ago, but was prevented by failure of materials to arrive.

READY TO COLLAPSE

Mr. Oesterlein Paints a Dark Picture of the Central European Powers

Ceras D. Oesterlein, of the Oesterlein Machine Co., Cincinnati, who has returned from a six months trip to Europe, does not take a hopeful view of the outlook. In giving his impressions he writes in part as follows:

"In Germany there is a critical shortage of food, coal and other raw materials and transportation facilities and her credit is practically that of a bankrupt. She and her allies are, however, asked to strip themselves of what remains and make up the balance of the cost of the war in labor spread over years.

"This is all justly to be expected but if we are to believe that Germany's acts during the war were as told she is not past taking up Russia's debacle and refusing to work if before that development another form of internal eruption doesn't result in the complete collapse of the nation.

"And yet it seems that Austria is in still worse shape at the moment than Germany. Reports also indicate that Poland needs assistance. Italy has just added to her troubles through the last election in November by placing the Socialists in control of the Government. This, by the way, resulted in a demonstration in the way of a general strike tying up entire cities while the writer was there. The industrial portion of Spain was in a turmoil with a general strike in Barcelona which drove the writer out of that country rather hurriedly, having been reliably informed that over 300 people were killed in a similar strike only six months earlier.

"These features point to the ripe condition for her collapse of a more or less general character. Now consider along with all of the above the general business conditions which likewise have a definite bearing on the matter.

Consumers, Not Producers

"Armies and navies are all consuming and non-producing which accounts for the fact that during the war the nations involved consumed more than they produced. The result is an unfavorable trade balance and reflects directly in the money exchange between nations. The effect can be seen from the following illustration:

"At about the end of July last year, the English pound sterling would buy only \$4.40 of our money instead of \$4.86, its normal equivalent. Because of this premium, the English were not inclined to buy from America, feeling that the pound would come back in value, and they didn't want to suffer the consequent loss. Along with mention of this condition came reference to America as the country whose pockets were already bulging with money. Just imagine how the feeling of that time has been intensified throughout the further falling off of the British pound to a value of only \$3.70 to \$3.80, whose value is yet to be depreciated by reason of the reduced purchasing power of our dollar. And yet, when the pound could still buy \$4.40 the British Government made known her foreign policy, which, as I remember, in substance anticipated protection for home industries and encouraged co-operation between British producers in handling the country's exports. The intent seemed clearly to get the business which competing nations had formerly gotten, and restrict invasion of their home markets.

Remember, English money had depreciated to only 80 per cent of its former value, whereas German money has depreciated to 8 per cent; how much less is it possible for Germany to compete in industry. This same exchange situation places nearly the whole of Europe in a difficult situation the seriousness of which is now so important that nations are just now being called together in convention to see if means can be found to avoid a catastrophe.

Machine Tool Conditions

"I was told time and again by machinery dealers in Sweden, Denmark and Switzerland that German

manufacturers think nothing of advancing prices from 50 to 100 per cent at a time, indicating that the process was already going on rapidly last fall. Surely before long the whole German indebtedness must be saddled on to their products and then who can afford to buy them?

"In industry consider for a moment the machine tool situation. It is hardly likely that Germany can in any event soon again carry on a large export business because of the tremendous acceleration given to this industry in neutral countries during the war. Imitations of American machines may be expected to take the place of German machines in many instances. The writer made inquiry, having seen many grades of finish on the No. 8 Brown & Sharpe cylindrical grinder, which firm is making this imitation? The answer was that in Sweden alone 11 different firms imitate this specific machine. Four copies of a certain milling machine also presented themselves. In Switzerland, whereas before the war there were only a handful of machine tool builders of which only one was of importance, today there are probably 150, according to the statistics published in the country. Even Spain is producing machine tools. The writer was surprised to see imitations of his own milling machines being produced in Christiania, Norway. In a similar way other industries have been developed in all countries because of failure of the former source of supply.

"In conclusion such an analysis as this convinces me that a grinding, wearing process is going on and will soon reach the climax when an explosion may occur and the conflagration will surely reach us. Therefore, before tempting extensions are made with which to take care of our immediate domestic business, a thorough consideration of this phase of the European situation is surely to be recommended."

French Pig Iron Output in 1919

According to the returns of the Comité des Forges de France, the production of pig iron in France during the first six months of 1919 amounted to 1,009,428 tons, of which 450,000 tons were produced in Alsace-Lorraine alone, leaving 559,000 tons as the total output in the rest of France, which produced 2,500,000 tons during the same period in 1913. Several furnaces have been blown in in the Meurthe-et-Moselle department since last June, but their output is greatly hampered by transport difficulties and the lack of coke. The estimated output for the second half year, including Lorraine, is 1,500,000 tons, so that the total production for the year will probably amount to between 2,500,000 and 3,000,000 tons for all the works in France, Alsace-Lorraine and the Saar district.

South African Iron and Steel Industry

According to *Modern South African Mining and Engineering Journal*, it has been decided to extend the Pretoria iron and steel industry to realize its full possibilities. Several small blast furnaces have been erected in the Transvaal in the past two years, and these had, from native ores, been turning out about 10 tons of pig iron per day. These experimental plants have demonstrated that pig iron of first-class quality can be produced. The pre-war price of pig iron in Britain was so low that manufacturing was not possible.

The present strike of Belgian postal and telegraph employees is interfering with communication with that country, from which a large number of inquiries have been coming for semi-finished material of all kinds. A New York concern exporting chiefly to this market recently shipped 1000 tons of sheet bars and 1600 tons of billets. This company has also sold several small orders of ferroalloys.

In a letter on the subject of ductility in metallic arc welds, published in *THE IRON AGE*, issue of Dec. 25, page 1341, the name of J. Hayward appeared in error as the writer of the letter in place of J. Churchward, metallurgist, Wilson Welder & Metals Co., New York.

New 14-In. Geared Head Lathe

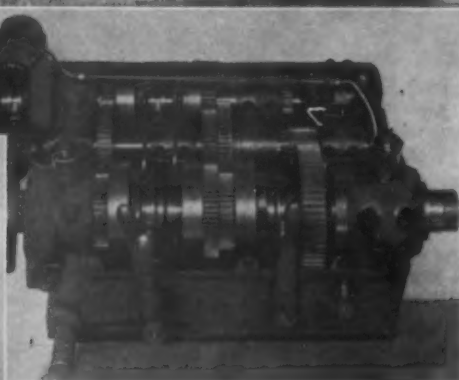
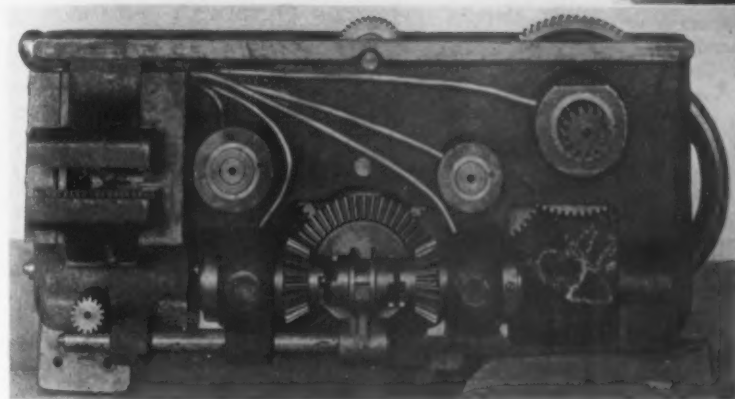
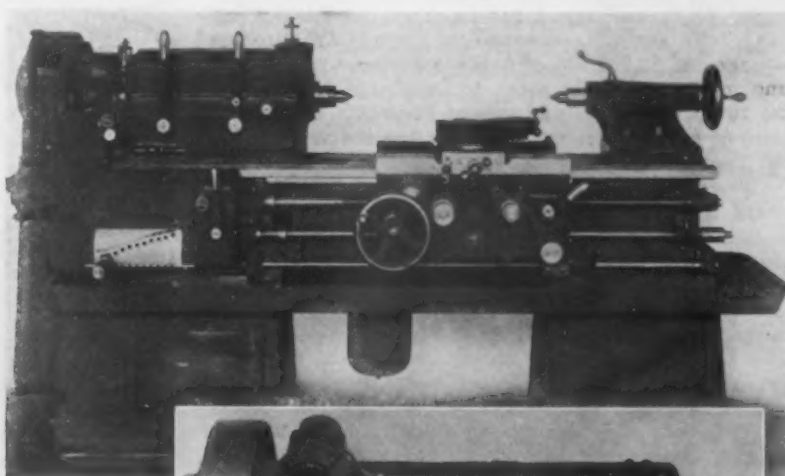
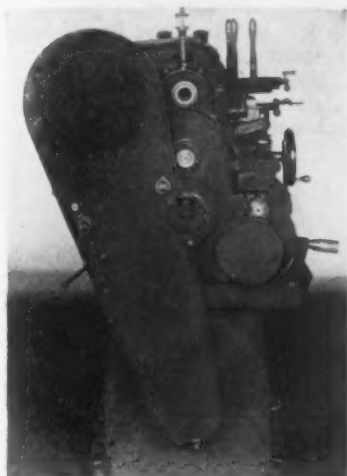
Greater strength, rigidity and neater appearance are the outstanding characteristics of the redesigned geared head lathe announced by the Reed-Prentice Co., Worcester, Mass. The machine it is stated is heavier than the average 14 in. lathe and only slightly lighter than the average 16 in. lathe. In order to make the machine pleasing to the eye, broken lines have been ironed out wherever possible, lugs and projections omitted, and unsightly oil cups avoided.

The bed has been widened and deepened and has been reinforced throughout by increasing the metal thickness and spacing the heavy ties closer. The top of the bed is of the drop V type, the inside Vs being

out transmitting any strain to the teeth of the gears. Another locking mechanism prevents the engagement of the spindle clutch until the plunger has been removed. In case the clutch is engaged, the locking mechanism keeps the plunger set at neutral position.

The rocker carrying the tumbler gears at the end of the head is of pull plunger design with locating holes in the side of the head. Ball bearings of the Gurney type are used in the drive pulley and the end thrust on the spindle is taken by a ball bearing and a check nut instead of bonnet and step screw.

The reverse control for the spindle is arranged so as to place the controlling members close to the bed, thus to give a neater appearance. Bevel gears and shafts are used in preference to the link motion for-



Reed-Prentice 14-In. Geared Head Lathe Redesigned for Greater Strength and Neater Appearance. The headstock is of the selective type, giving eight speeds. An oil reservoir in the corner of the apron lubricates all bearings in the rear plate

lower than the outside thereby preventing any excessive cut in the bridge of the carriage.

The head stock is of the selective type giving eight speeds. These can be made without slowing down the machine or without removing the cutting tool from the work. The speeds are obtained through the use of spur gears and internal expanding friction clutches of special design. It is explained that it is impossible to engage conflicting ratio of gears as it is necessary that the three levers be in operative position in order to start the spindle. Therefore, any one of the levers when brought to a neutral position will at once stop the spindle. A geared pump in the head stock supplies the lubrication for all of its bearings, with the exception of the two main spindle bearings, which are supplied from sight feed oilers.

The back gears have been brought up to a plane with the spindle and pulley shaft which makes them more accessible and permits the bottom of the head to be cast solid so that the gears may be run in an oil bath. The intermediate bevel gear in the reversing attachment has been brought up to a plane with the pulley shaft, giving a more accessible condition for adjusting the friction fingers when necessary.

In order to remove the face plate from the spindle nose, a locking mechanism has been introduced in the form of a plunger which prevents the rotation of the spindle and permits the removal of the face plate with-

merly used. The control handle for the stop, start and reverse is located at the right hand lower corner of the apron in a convenient position for the operator. The quick change gear unit has been modified so as to make it more accessible, more rigid and neater in appearance.

The double plate apron construction is used which gives access to the internal mechanism without removing it from the bed. The front plate is bolted to the rear plate and may be taken off by removing six cap screws, thereby exposing the gears inside of the apron. The open-and-shut nut is planed into the guide cast integral with the rear plate. A locking mechanism prevents the engagement of the longitudinal feed when the open-and-shut nut is engaged and vice versa. Both longitudinal and cross feeds are friction operated. An oil reservoir is placed at the upper right hand corner of the apron for lubricating all of the bearings in the rear plate. The front bearings are lubricated by oilers at each bearing.

The carriage has been redesigned to give more area to the sliding surfaces on the Vs of the bed. The tail stock is supported by two Vs, the additional V acting as a clamping device wherever the tail stock is located. The taper attachment has been provided with a gib engaging a ledge planed the entire length of the taper bar, thus to eliminate a tendency of the shoe to lift from the bar when under pressure.

Two types of motor drive are provided. Generally

the motor is mounted on a bracket at the rear of the machine, secured to a pad cast integral with the head-end leg and driving the head shaft through spur gears.

When the motor is not too large, it can be mounted inside of the head-end cabinet leg and connected to the head drive shaft, either by belt or silent chain.

Penn Seaboard and Tacony Companies Consolidated

A consolidation of the Penn Seaboard Steel Corporation and the Tacony Steel Co., both of Philadelphia, is to be effected at a meeting of the stockholders of the former concern at its New York office, 111 Broadway, on Feb. 4. The Penn Seaboard Steel Corporation has obtained an option on all of the stock of the Tacony Steel Co., and additional Penn Seaboard stock will be issued to be exchanged for stock of the Tacony company. Financing arrangements include the proposed issuance of \$2,000,000 of 7 per cent three-year sinking fund convertible gold notes, to be offered for sale, and the further issuance and sale of \$1,500,000 of the same class of security for exchange for the common stock of the Tacony Steel Co.

The new corporation will be known as the Penn Seaboard Steel Corporation, and officers will probably be elected at the Feb. 4 meeting. Rodney Thayer is chairman of the board of directors; Charles Hart, of the Delaware River Steel Co., Chester, Pa., is president, and William C. Sproul, Governor of Pennsylvania, is a large stockholder and director of the Penn Seaboard. The Tacony Steel Co. is headed by John B. Warren as president and George Satterthwaite is vice-president and treasurer.

The Penn Seaboard Steel Corporation was incorporated in 1916 to take over the Seaboard Steel Casting Co. and the Penn Marine & Ordnance Co. The latter company, shortly before its consolidation with the Seaboard Steel Casting Co., had taken over the Balducci Steel Co., New Castle, Del., and the Penn Steel Castings & Machine Co., Chester, Pa. The Penn Seaboard Steel Corporation now operates two plants, one at Chester, Pa., and one at New Castle, Del. It also owns a plant at New Haven, Conn., which is not now being operated and which has been on the market for sale for some months.

The Tacony Steel Co. is an outgrowth of the Philadelphia Steel & Forge Co., the name having been changed a few years ago. During the war the Tacony Steel Co. organized the Tacony Ordnance Corporation, which built for the Government a gun forging plant costing several million dollars. This plant was purchased shortly after the end of the war by the Tacony Steel Co.

When the consolidation of the two companies is brought about, its products will be forgings, steel castings, steel billets and bars, particularly alloy bars for automobiles and similar purposes. Early plans for the consolidation included the Delaware River Steel Co., which operates a blast furnace at Chester, Pa., but this part of the plan was abandoned. Some time ago the Penn Seaboard Steel Corporation converted its blooming mill into a plate mill, but it will be changed back to a blooming mill and billets and blooms will be produced for the bar mills at the Tacony plant. The new company will have eight open-hearth furnaces.

General selling offices of the new company will probably be maintained in the Franklin Trust Building, Philadelphia.

Exhibition of Mechanical Inspection

The American Society of Mechanical Inspectors will hold its first annual exhibition of mechanical inspection equipment on the roof of the Hotel Astor, New York, Feb. 2 to 6. There will be an informal dinner the opening night, Feb. 2, reservations for which are being made by the secretary of the society, H. F. Winter, 29 West Thirty-ninth street, New York. During the exhibition luncheons will be held each day on the hotel roof. Among the exhibitors is the United States Bureau of Standards, Gage Section. The major part of the bureau's laboratory equipment will be shown, including the projectograph, Anderson micrometer, sine

plates, gage blocks and thread lead tester. The Arthur Knapp Engineering Corporation will be represented by Arthur Knapp and B. M. Smith, chief engineer; C. E. Johansson, Inc., by Messrs. Dannehower, Mentor and Raseley; the Greenfield Tap & Die Corporation by Messrs. Schoof and Barstow; the Pratt & Whitney Co. by Major Earle Buckingham; the Coats Machine Tool Co. by Charles Coats; the West & Dodge Co., Boston, by Messrs. Cole and Law; the Wilton Mfg. Co., Boston, by Mr. Van Kuren; the College of the City of New York by Prof. D. B. Steinman, director of engineering courses. Other exhibitors will be the Shore Instrument Mfg. Co., the William Brewster Co., the Inspection Engineering Equipment Co., Holz & Co., Inc., the Inspector Publishing Co., the Industrial Press Publishing Co. and the New York Testing Laboratories.

Algoma Mill's Orders

The Algoma Steel Corporation, Ltd., Sault Ste. Marie, Ont., has sold heavy tonnages of rails which will employ practically its entire rolling capacity for 1920. The orders in detail are as follows:

- 140,000 gross tons 85-lb. standard C. P. R. section, for the Canadian Pacific Railway Co.
- 50,000 gross tons 85-lb. standard C. P. R. section, for the Canadian National Railways.
- 35,000 gross tons 100-lb. A. R. A. type A section, for the Grand Trunk Railway.
- 2,167 gross tons 90-lb. A. R. A. type A section, for the Temiskaming & Northern Ontario Commission.

From the early days of the war until the signing of the armistice, the mills of the Algoma company were entirely at the service of the Canadian Government in producing steel for munitions of war. Practically all "held over" tonnages of rails from the war period have now been rolled, leaving the way clear for work on the new orders previously mentioned. The Algoma company has made no sales of rails to American roads for 1920 rolling.

In addition to its rail commitments the Algoma company has taken large orders for shapes for the Canadian trade. In this connection it should be noted that in the fall of 1919 the Algoma mills commenced the production of all American standard sections of structural beams and channels up to and including 15-in., angle and zee-bar sections, etc. The company is also actively engaged in the production of alloy steel for automobile parts and similar purposes. It furnishes these alloy steels, which include chrome vanadium, chrome nickel and nickel, in blooms, billets, slabs or bars, and is steadily increasing its bookings in these products, particularly with the Canadian automobile trade.

Chicago Lake Front Improvements

The Chicago lake front improvement plan, which includes the construction of large new passenger and freight terminals by the Illinois Central Railroad, has been approved by the War Department. Following a conference with Walter L. Fisher, representing the Chicago interests, Secretary of War Baker announced, last week, that a question involving the title of made land had been waived by the War Department pending enactment of necessary laws by the Illinois Legislature. Secretary Baker and the chief of engineers of the War Department have agreed to sign the permit for the improvement as soon as the ordinance containing the conditions specified by the engineers is approved by the Chicago council, the Chicago South Park Board and the Illinois Central Railroad.

The annual general meeting of the Iron and Steel Institute will be held in London, England, May 5 and 6. By the invitation of the retiring president, Eugene Schneider, arrangements are in progress for holding the autumn meeting next September in France.

New 12-In. Cam Milling Machine

Change from vertical spindle to that of horizontal type is the distinguishing feature of a redesigned milling machine for cutting either flat or cylindrical cams now being marketed by the Garvin Machine Co., 147 Varick Street, New York.

One of the accompanying illustrations shows the machine arranged for flat cam work. In this set-up the work is mounted on the end of the work arbor, toward the spindle with the former at the outer end of the arbor. Worm and worm gear drive the work arbor from the universal power feed shaft. Power is transmitted through spur gearing, giving three changes of feed for the flat cam cutting fixture only.

The arm containing the work arbor pivots on the forward end, and is guided at the rear end by guides, all mounted on the same table. The arm has, in addition to its own weight, that of detachable weights to keep the former pin against the former, offsetting

provided on the machine when using the fixture for cutting cylindrical cams. Details are as follows:

Capacity any type of cam, in.....	1 to 12
Taper hole in spindle.....	No. 10 B. & S.
Size of cutter used, in.....	3/16 to 2
Number of feed changes by four-step friction cone pulley	8
Cylinder cam throw, in.....	9 1/2
Flat cam throw, in.....	6
Number of feed changes on flat fixture only.....	3
Number of feed changes on cylindrical fixture.....	2
Swing of cylindrical fixture, in.....	12 1/2

Conradson Machine Plant Now Producing

The plant of the Conradson Machine Tool Co., Green Bay, Wis., has been completed and has commenced production. The new corporation is affiliated with Joseph T. Ryerson & Son, who will market the output, consisting of selective head engine lathes, plain and universal milling machines, planers, and radial drilling machines.



Horizontal Type Milling Machine for Cutting Flat or Cylindrical Cams. The left hand illustration shows the machine arranged for milling flat cams. To adapt it for work on cylindrical cams, as shown in the other illustration, the entire slide which is bolted to the saddle can be taken off and laid aside. The power feed universal joint can be detached and then attached to the cylindrical fixture.

the stress of the cutter. These weights can be added to either end of the arm, and are made so as to release the pressure on the former when cutting steep angle cams. The other illustration shows the machine arranged for cutting cylindrical cams. In changing the flat cam fixture to the cylindrical fixture, the entire slide shown bolted to the saddle of the machine can be taken off and laid aside. The power feed universal joint shaft detaches for this purpose and attaches to the cylindrical fixture.

In operation the feed rotates the work on the work arbor, the work being mounted on the far side of the fixture and the former on the other end of the work arbor. The former pin, shown in the front of the machine, is kept against the former by weights.

The movement of the cylindrical fixture is explained as very sensitive, as it works on large balls in a V-shaped, tool-steel track. The feed of both attachments can be disconnected by clutch, giving hand feed control by wrench. This is emphasized as desirable in setting up for cams that are cored, also for helping over steep angles. The feed of both attachments can be disconnected by clutch feed control by crank wrench.

The worm shaft is provided with a square end to receive the crank. The spindle of the machine is of Garvin standard milling machine construction. All gearing is housed, protecting it from damage or injury to the operator. There are two changes of feed

Ryerson-Conradson is the trade name under which these tools are being sold. The new line embodies some departures from present designs of similar machines, and is calculated to fill heavy duty production requirements. The president of the new company is C. M. Conradson, who has long been identified with the machine tool field, at one time having been associated with the Gisholt Machine Co., Madison, Wis., and later being engaged in general consulting work in tool design.

Ground was broken for the Conradson plant in the spring of 1919 and the building was recently completed and fitted with equipment. The plant is situated on the west bank of the Fox River on a tract of about 12 acres. The main structure is 192 x 192 ft., with saw-tooth roof to provide overhead lighting. About two-thirds of the floor space, 128 x 192 ft., is occupied by the manufacturing shop, tool room and store room. The remaining portion of the structure, 64 ft. wide and 225 ft. in length, including a 33-ft. projecting wing, constitutes the erecting bay and is served by a 10-ton Pawling & Harnischfeger crane. The other three sides are of timber to permit the construction of extensions. While one of these walls abuts on the river, the latter will be filled in when an addition is desired in that direction. Adjoining the northwest corner of the shop structure is a brick power house and heating plant, 33 x 65 ft. There are also two detached buildings, a two-story office structure, 32 x 40 ft., and a pattern shop, 22 x 103 ft.

Machines for Salvaging Rivets, Bolts and Nuts

The reclaiming of rivets, bolts and nuts accumulating in the salvage piles of shipyards and structural steel plants has always been a serious problem. Various methods have been adopted and appliances devised in the attempt to salvage this available material and place it in a usable condition. The International Reclaiming Co., through its agents, Nelson, Lodge & Snyder, Widener Building, Philadelphia, have placed on the market two devices which during the past year, it is explained, have proved their efficiency in reclaiming rivets and bolts in various shipyards.

One of these machines is designed to sort rivets and bolts as to length. It consists of a table made up of cast-iron segments slotted on the outer edge for carrying the rivets or bolts, and motor-driven through worm and bevel gears. Each machine is regularly supplied with two sets of segments, one handling $\frac{3}{8}$ -in. and $\frac{1}{2}$ -in.



Bolts and Nuts with Corroded or Burred Threads Are Re-threaded and Tapped By the Machine Shown at the Left. The other machine is for sorting bolts or rivets as to length. The bolt or rivet, which is placed in a slot on the rim of the table by the operator, is tripped when it reaches the cam set for its respective length and drops down a chute into its keg.

diameters, and the other set $\frac{3}{8}$ -in. and 1-in. diameters.

Rivets or bolts, all of one diameter, but any length, are fed to the material tray immediately above the machine, and inclined toward the two operators who place them in the slots of the revolving table. This table is turning at about 3 r.p.m., or a rate which will permit the operators, working normally, to fill all slots as they pass. As each rivet or bolt approaches the cam set for its respective length it is tripped or dropped through a chute to its keg.

The sorting machine has 20 cams, which can be adjusted and set to take care of a variation in rivet or bolt length as close as $\frac{1}{8}$ in. This adjustment allows the machine to be set to handle any combination of lengths. Two men working normally, the manufacturer states, can feed rivets or bolts to the machine at the rate of 125 per min., or 7500 per hr.

The other device, a bolt and nut assembling machine, is explained as taking the place of bolt threading and nut tapping machines, thus to make a saving in the initial expense for equipment and to eliminate die and tap replacements. Bolts and nuts with corroded or burred threads, it is explained, are quickly rethreaded and tapped and placed in serviceable condition.

The machine is driven from a counter shaft by open and cross belts. A foot-operated clutch engages one pulley on a forward motion and the other pulley on the reverse motion. A bolt is placed in the chucks and a slight pressure on the sliding chuck runs the nut up over the threads. The pedal control reverses the operation and the nut is backed off.

Announce New Heater for Boiler Feed and Hot Water Service

A new heater, known as the G-R instantaneous heater, which retains the distinctive features of the company's Goubert heater, is announced by the Griscom Russell Co., 90 West Street, New York. A higher heat transfer factor and a more compact construction for any desired capacity and pressure drop are the features emphasized for the new design.

The water pressure passes through the tubes and is heated by the exhaust or live steam in the shell surrounding the tubes. Only a few seconds, it is stated, is required for the passage of a drop of water through either the two, four, six or eight passes in which the tube bundles are arranged, but during this short space of time the water is heated to the desired temperature. Another feature emphasized is that the heater can be operated in excess of the rated capacity with only a slight reduction of the final temperature of the water.

In addition to its use as a boiler feed water heater, it is used where large quantities of water are required to be heated by live or exhaust steam such as in factories, dyehouses, etc., also as a hot water converter in large buildings where the water is circulated through the heating system by a pump and the returning water receives the heat lost in the heating system from the converter.

The shell is designed for working pressure of 50 lb. per square inch, and tubes and water chambers for 250 lb. per square inch. The heaters are made in various sizes of 2, 4, 6 and 8 pass.

W. E. Hardy, F. H. Rice and H. H. Whitesel and associates, who have been operating the Boston Belting Corporation (so far as production and sales are concerned), have purchased and taken over all assets of the corporation which relate to the mechanical rubber goods business. The Boston Belting Co., whose major assets had been transferred to the Boston Belting Corporation some two years ago, had never been dissolved; consequently on Nov. 6, when Thomas A. Forsyth and J. H. D. Smith resigned as directors and officers, president and treasurer respectively, their positions were filled by the election of W. E. Hardy, president and general manager; F. H. Rice, treasurer, and H. H. Whitesel, director and sales manager. Therefore, the business is picked up without break, inasmuch as the new officers had operated the company for two years prior to its sale, under the management of Mr. Forsyth.

SHORT TRADE ITEMS

To engage in a general foundry business Peirce-Brown, Inc., North Tonawanda, N. Y., has been incorporated for \$350,000. Ten acres of land was recently purchased from the Donner Steel Co. and building of the 100 x 300 ft. foundry will start before June 1. It will be of brick and steel construction. Most modern equipment will be installed and a force of 100 will be employed at the start.

The J. W. Sanders Co., also known as Sanders, Keller & Co., with offices in New York and Philadelphia, has decided to revert to its original name, due to a discontinuing of the connection with Mr. Keller and the Philadelphia office, this to take effect Feb. 1. O. A. R. Schraeder will continue as formerly to cover Philadelphia and the surrounding territory.

The plant of the Elm Grove Enamel Co., near Wheeling, W. Va., which has been idle for some months, is being made ready for operation and will start in a short time.

The Erie Malleable Iron Co., Erie, Pa., is erecting a four-story office building, 45 x 67 ft., to cost about \$45,000. Everything in connection with this building has been contracted for.

The Gorham Mfg. Co., Providence, R. I., has sold its plant and all machinery and equipment, exclusive of the property of the Government located there, to the Franklin Process Co. The realty is assessed on a valuation of \$153,480.

A contract recently signed between the Fairbanks Co., New York, and the Lincoln Electric Co., Cleveland, Ohio, gives the former company the exclusive distribution of Lincoln Electric motors for industrial applications.

The Worth Brothers Corporation, Claymont, Del., is planning for extensions at its local plant during the present year, to cost close to \$2,000,000. Work is now under way on the erection of a new rolling mill and other buildings will be constructed to double the present working force of 500 men. The equipment to be installed in addition to rolling mill machinery will include shears, furnaces, etc., and cranes. The local housing development will be increased by about 100 new homes. The company recently increased its capital from \$2,500,000 to \$5,000,000 for expansion. Norman R. Entrekin is general superintendent.

The Combustion Engineering Corporation has enlarged its facilities for handling business in the Philadelphia territory. The office of the company in this territory is located in the Lincoln Building and W. C. Stripe, formerly of the Pittsburgh office and formerly of the Westinghouse company, becomes manager of the Philadelphia district. Associated with him in that territory on the active selling force are C. L. Bachman, recently returned from active military service abroad, who was formerly manager of the Chicago office of the Combustion Engineering Corporation before the war, and E. F. Kuehnle, formerly of the main office in New York.

The Donner Steel Co., Inc., Buffalo, announced a change in address of its New England representative, Ralph E. Sharp, to 30 Hemenway Street, suite 38, Boston.

The Philadelphia Rapid Transit Co. will equip its Mount Vernon Street power station with a powdered coal system for firing the boilers, using river and buckwheat anthracite coal. This plant is at present producing about 75,000 kw.-hr., employing 20 375-hp. Babcock & Wilcox water-tube boilers. With powdered coal firing only 10 boilers will be used to obtain this output. The powdered coal equipment will be the Quigley system, including apparatus for preparing,

distributing and burning the fuel. Three thousand pounds of coal per hour is the capacity of feeding and burning equipment for each boiler.

The Central Tube Co., Pittsburgh, works at Economy, Pa., is considering enlarging its capacity for the manufacture of conduit pipe. The company also recently installed Hughes gas producers to replace others.

The Service Engineering Co., 25 Church Street, New York, has been incorporated with capital stock of \$50,000, to render general engineering service and to specialize in the design of tools, jigs, fixtures and methods for interchangeable manufacturing of motor cars, motor trucks, typewriters, adding machines and other products made in quantities. The officers of the new company are Albert A. Dowd, president; Donald A. Baker, vice-president; Fred E. Rogers, treasurer; Thomas P. Orchard, secretary. The company employs a force of about 60 men, and is prepared to give engineering service on short notice.

The Morris-Rogers Steel Co., Cleveland, has been incorporated with a capital stock of \$100,000 and has taken over the business of the Morris & Son Co., dealer in seconds in black and galvanized sheets. Additional capital has been provided to take care of an expansion in the business. E. D. Rogers and J. D. Rogers have become associated with the company, the former as vice-president and the latter as treasurer. F. H. Morris is president and H. V. Morris secretary. The company has a warehouse at 2625 East Seventy-sixth Street, Cleveland, another warehouse in Chicago and a Detroit representative at 858 Penobscot Building.

The factory of the Chapman Mfg. Co., Winchester, Mass., mill spindles and automobile parts, was damaged to the extent of \$75,000 by fire on Jan. 22. Much machinery in the plant was destroyed.

The Duff Jack Sales Co., Ltd., located in the Oxford Circus House, 245 Oxford Street, London, W. I., England, has been formed to represent the Duff Mfg. Co., Pittsburgh, in the British Isles, and has been given the exclusive agency in that territory for Duff and Barrett jacks.

The McCord Mfg. Co., manufacturer of carburetors, metallic gaskets, etc., Detroit, has purchased the Russell Motor Axle Co., North Detroit; McCord & Co., manufacturers of journal boxes, draft gears, etc., Chicago, and the Racine Mfg. Co., manufacturer of automobile bodies, Racine, Wis.

Unsecured creditors of the Barnum-Richardson Co., Lime Rock, Conn., which operated pig iron furnaces and a car wheel foundry, whose claims so far deposited amount to \$85,000, are to receive 5 per cent of their claims.

The Trumbull Steel Co., Warren, Ohio, has contracted with the Fuller Engineering Co., Allentown, Pa., to remodel its pulverized coal installation. The Fuller company will remodel the coal plant building, placing two 57-in. Dreadnaught gear driven mills and a 5½ x 42 ft. indirect fired drier with the connecting parts. The pulverized coal from the Fuller mills will be transported by the Fuller-Kinyon pumping system to the pulverized coal bins located at the furnaces. At the bottom of the hoppers will be attached screw feeders and motors of the standard design used for mixing coal dust and air for projection of the mass into the furnaces.

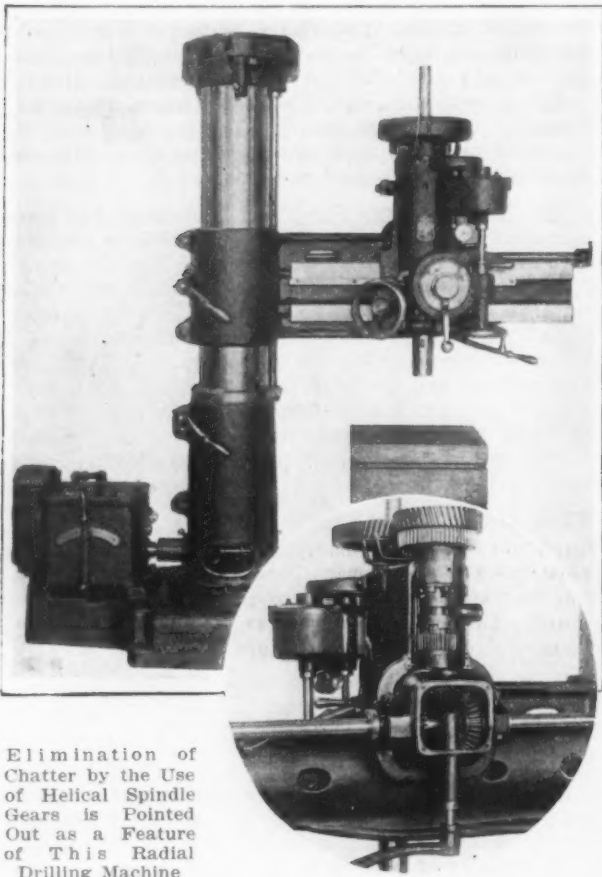
The Novelty mine, first operation of the H. C. Frick Coke Co., is again turning out coke. The old mine which has some unworked cold land left, has been taken over by the Corrado-Schenck Co. which is operating a score of ovens. It is believed there is yet enough coal unmined to permit operations for nine months or a year.

Charles Hubbard & Co., 81 Fulton Street, New York, have been appointed agents in the states of New York, New Jersey and Connecticut, of the Falls Hollow Staybolt Co., Cuyahoga Falls, Ohio, manufacturer of Falls hollow and Falls solid staybolt iron.

New Radial Drilling Machines

Helical spindle gears are emphasized as a feature of new style 2½, 3 and 3½-ft. radial drilling machines now being marketed by the Morris Machine Tool Co., Cincinnati. Other features emphasized are the enclosed spindle and sleeve, enclosed gears, tapping attachment gears and reversing clutch running continually in a bath of oil, and the graduated dial depth gage which trips the spindle feed at the desired depth.

The angle of the teeth of the helical spindle gears, it is explained, is enough to have more than one tooth



Elimination of Chatter by the Use of Helical Spindle Gears is Pointed Out as a Feature of This Radial Drilling Machine

meshing at one time and to avoid end thrust, the result of which is to have a constant power factor at the cutting point of the tool, thus to eliminate the slight chatter effect usual with spur gears, besides insuring a quieter drive and a stronger gear.

The head is explained as being exactly balanced on the ways of the arm, thus permitting it to travel easily. The head is moved along the arm by a rack and pinion, reduction gears and a hand wheel on the left-hand side at the lower part of the head, thus placing it within reach of the operator when the arm is at its highest position. The head is clamped by two screws operated by one handle against the gib.

The column is supported by both a ball bearing and roller bearing in the stump, where it is rigidly clamped. The arm is raised and lowered by power through the lever at the top of the column, which has a tendency of throwing itself into neutral when the tumbler gears are engaged, thus making it necessary for the operator to keep his hand on the lever when raising or lowering the arm.

The back gears are mounted in a fully enclosed bracket directly in back of the head. Through these gears two speeds are obtained by a lever on the left-hand side of the head. Reversing gears and friction clutches are mounted in the same bracket, fully enclosed and running in oil. The feed box is a unit mounted on the head, and feed gears are fully enclosed. Four feeds are obtained and are marked on a dial in thousandths advance per revolution of the spindle.

The speed box is mounted on the base, and provides six speeds, three speeds through the vertical lever on the front of the box which are doubled by the friction

lever on the top of the box. The top lever controls the double friction clutch on the pulley shaft and when in neutral position stops every revolving part except the pulley shaft. Friction clutches in the speed box and the tapping attachment are of the expanding ring type.

The drive can be arranged either through a four to one variable speed motor connected to the lower shaft by one pair of gears, or constant speed motor in connection with the gear box.

Ford Motor Co.'s Safety Report

A synopsis of accomplishments of the department of safety and factory hygiene of the Ford Motor Co., Michigan, for the year 1919 has been published. This shows a record of but one fatality among nearly 50,000 workmen. The previous year's report shows three deaths. The Ford company launched the safety movement in 1914, and since then has carried on a constant crusade, resulting in an 80 per cent reduction in lost time accidents, without in the least hampering production.

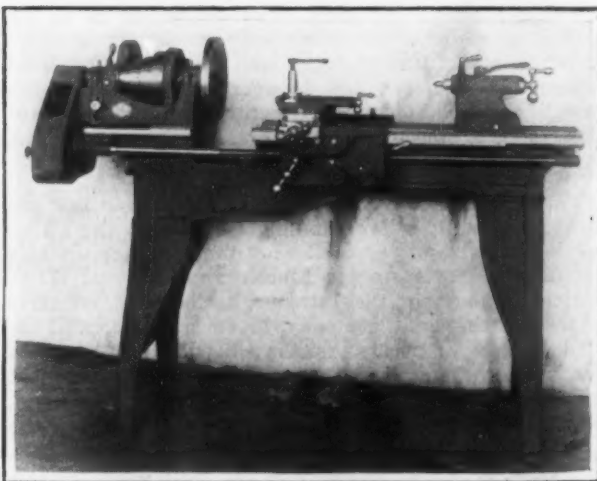
The safety and hygienic department consists of four general inspectors, five special inspectors highly skilled in their particular work; one stenographer, two educational men, one bacteriologist, and one hygienic man, with seven men to clean drinking fountains twice each day and spray disinfectants throughout the plant. Accidents were investigated by the general and special inspectors and remedies applied when possible. There were approximately 2700 orders and communications issued and completed to prevent accidents in 1919.

Announce Two New Gap Lathes

Two sizes of gap lathes with 11-18-in. swing and 13-21-in. swing are announced by the Seneca Falls Mfg. Co., Inc., Seneca Falls, N. Y. In designing these lathes the gap has been added to the other features of the company's line of "star" screw cutting lathes.

The bed is of the box section type, braced by cross webs and made heavy through the gap section, thus to insure accuracy. A bridge piece is furnished to close up the gap when the extra swing is not needed. The beds are made 5, 6, 7, 8 and 10 ft. long.

The carriage has the cross slide placed at the left



The Gap Is the New Feature of the Latest Seneca Lathe. Two sizes are made with 11-18 in. and 13-21 in. swing

hand for convenience. The cross feed screw is supplied with a micrometer collar graduated in thousandths of an inch. The apron has a safety device, so that longitudinal feed and split nut cannot be engaged at the same time. All standard threads from 3 to 72, including 11½ and 27 pipe threads, can be cut. The lathes can be equipped with transposing gears or a metric pitch lead screw for cutting metric threads.

A line of attachments, including raising block, quick change gears, taper attachment, motor drive, draw in chuck, milling and gear cutting attachment, turrets, relieving attachment, etc., may be used.

Germany Wrestling with Steel Prices

Plan to Establish System of Bounties for Necessary Imports and Maximum Prices for Home Trade—Prices Still Soaring

(Special Correspondence)

BERLIN, GERMANY, Dec. 31.—When the great Krupp company passes its dividend two years in succession and reports a loss of 36,000,000 marks for the past business year, it is evident that the German iron trade is in a bad way. Of course, this company occupies a somewhat exceptional position among the German iron companies, as it had diverted its plant much more completely than other concerns to the production of artillery and other munitions of war; hence the abrupt change from war to peace production hits it more severely than others. I told in previous letters how the company is feeling around for new lines of production. The annual report mentions a variety of new goods that have been taken up as regular products of the company, including gas engines, auto trucks, various kinds of small machines, locomotives and freight cars and agricultural machinery.

Talk of Maximum Prices for Home Trade

The matter of chief interest in the iron trade just now is the action of the government, which is negotiating on various points with the representatives of the trade. The government has been convinced, apparently, by the heavy advances of prices put into operation at the beginning of this month that it is necessary to re-introduce in the home trade the system of maximum prices which was abolished on Jan. 5, 1919. Since that date, as the under-secretary in the economic ministry pointed out in a conference with the iron manufacturers about two weeks ago, the price of bars has risen from 225 to 1750 marks a ton.

So far as the increased prices affect the export trade, the government is by no means opposed to them, but is even demanding that export prices shall be made to correspond with foreign prices; but in the interests of home consumers it regards maximum prices as necessary. The under-secretary took the position that since the manufacturers had failed to regulate prices and distribution, it would be necessary to prepare the way by legislation for the organization of self-governing bodies in the trade. A resolution was finally passed recommending that the fixing of prices be left to these bodies, after they are organized. Further negotiations were provided for, with the understanding that if they do not lead to positive results by the time the National assembly meets again it shall be asked to enact legislation for fixing prices and controlling distribution.

Virtual Bounties for Imports

Negotiations have also been in progress in Duesseldorf, from which it appears that the economic ministry is aiming at the following results:

1—Fixing prices at a level covering the costs of production and a reasonable profit;

2—The control of the home trade by means of a so-called compensation fund, in connection with legally fixed maximum prices for producers, wholesalers and retailers;

3—To make it possible to meet payments on current imports of Swedish ores and other foreign raw materials as well as liquidating old debts on ore imports by the direct export of iron and steel products—this by allotting the incoming foreign orders for iron and steel chiefly to the works having such ore debts;

4—To use the compensation fund for facilitating the import of pig iron and semi-finished steel from abroad, thus increasing Germany's supplies of goods. This system, amounting to giving bounties upon imports, is designed as a temporary measure, to be abolished later, after the increased coal production in

Germany shall have brought up iron production more nearly to the normal level;

5—To guarantee the supplying of the most urgent and necessary demands from home consumers, like the railroads and agriculture.

The information given out about the proposed compensation fund still leaves its workings involved in obscurity. It is remarked in the above connection that there is no intention to equalize the costs of production as among the different producing concerns, "but only to remove certain fundamental differences in the costs of production"—which must remain cryptic till complete information is at hand.

About ten days ago negotiations were also opened with the organized wholesalers. They are reported to agree to the proposal made at Duesseldorf that self-governing bodies be organized, having a common law claim against its members for the enforcement of obligations. The government has also been negotiating with consumers, and they are also reported to be in sympathy with its plans.

High Coal Prices Feared

Another meeting is to be held Jan. 9 for the further discussion of these matters, and at that time something definite will probably be decided as to prices. There is still considerable uncertainty as to prices after that date. The price of pig iron was regarded as uncertain owing to doubt as to further advances of ore and coal prices. The ore producers, however, have just voted to leave prices unchanged during January; but coal producers are demanding a further big increase, and the decision has not yet been announced. They even want to double coal prices—which is regarded by iron producers as a monstrous proposal. They say that doubling coal prices would necessitate the increase of bar prices to a point that would make exports impossible.

The view prevails among iron men that if the government fixes maximum prices on ingots and bars it will only be possible to enforce them if the trade in scrap be also regulated. Not only must maximum prices on them be fixed, it is demanded, but the delivery of material must be guaranteed. It was actually proposed by the producers in these conferences that the stocks of dealers be expropriated by the government. This demand was put forth upon the ground that the prices of old material had been unduly driven up by speculators, so that there is now no profit in working it up into steel.

Steel-Works Association Continued to May

The further existence of the Steel-Works Association, referred to in my last report as likely to cease at the end of this month, has again been temporarily insured by the economic minister, who ordered it continued until April 30. He hopes by that time, evidently, to get his new organizations into operation. It is reported that this prolongation has this time the support of the two great companies which had hitherto held aloof, so that the prospects for unity of action are better.

Higher Open Market Prices

An inquiry among the members of the association showed that the majority of them favored leaving the prices of semi-finished material, structural forms, rails, bars and similar goods unchanged during January. On the other hand, it is reported that in the open market advances of 300 to 400 marks a ton on bars, plates and rods are demanded. The works in the Saar district, now under the control of France, and free to sell at their own prices, are reported to

be offering bars in the occupied districts at 2,600 marks, and considerable quantities of them have found their way into unoccupied Germany at 3,000 marks.

All of which shows that the tendency of prices is still upward. In view of the great scarcity of materials as well as finished goods, it is expected that prices will continue very strong; and it is by no means improbable that a higher list will be adopted by the Steel-works Association. It is mentioned that there is a strong sentiment in the organization favorable to higher prices. Most of the works want to bring up the home prices to the level of foreign markets. Berlin dealers have recently raised the prices of thinner sheets by 60 marks the metric hundred weight; also bars were raised to 219 marks the metric cwt., which denotes an advance of 81.50 marks over previous prices. This, however, was only a re-adjustment in accordance with the new prices of the producers reported in my last letter.

The makers of cast steel goods have recently made a big advance in export prices. They demand hence-

forth payment in the currency of the purchasing country, with advances averaging about 300 per cent.

The fuel difficulties have by no means been removed, although production of coal has increased and transportation has been more active. Within the past week or two, however, coal shipments have again fallen off, and the difficulties of iron makers and mines have again grown acute. In the Siegerland region a good number of additional mines have had to shut down; and there is danger, it is reported, that some of these will be flooded. In the Essen district, too, some important steel plants have had to close down; and here at Berlin the Loewe machine tool works have just had to shut down for a week for lack of coal.

In connection with foreign efforts to gain control over German iron companies, referred to in my last letter, it is now reported that a Dutch ore firm has bought the stock of Prince Henckel-Donnersmarck in the Kraftwerk at Stettin, which gives it a majority of the stock. The company produces only pig iron. Several years before the war it secured a furnace plant in the Essen district.

GERMAN MACHINERY

Sales Being Made at Very Low Prices—Machine Tools in the Open Air

The Manufacturers' Association of Connecticut, Inc., Hartford, has issued an interesting bulletin on "European Trade and Exchange." The bulletin quotes a letter from a competent business authority in Holland which presents forcefully and vividly certain conditions respecting trade with Holland, Belgium and France—together with Germany's influence on the situation. In part, the letter says:

"We have here in Holland conditions such as have never been seen in history and which very probably will never come back. It is as if at present Germany is liquidating everything she can sell at any price if she only can import food in return. The mark has fallen to an undreamed of low value, being to-day worth less than two American cents. All kinds of German machinery are offered at prices in marks which, while two or three times as high as before the war, with the mark only one-twelfth of its value are really much lower. One would think the Germans had decided to quit industry, because machine tools are imported into Holland in such quantities as we never thought were available in Germany. They are imported not by the millions of marks, but by millions of marks, in value. Trainloads are sold in the street like toys on Broadway. In a meadow near Utrecht are about 5000 machine tools, in the open air, uncovered, and sold to anybody willing to give a handful of marks for them. We are offered lathes, shapers, planers, upright drills, in lots of 300 and 500 at a time.

"A good-looking German lathe with lead-screw and separate feed-shaft is offered for 5000 marks, which means \$80. Only yesterday 500 bench sensitive drills, complete with a kind of Jacobs' chuck, were offered at the equivalent of about \$1.25, or less than the price of a Jacobs' chuck.

"From the above you will see how really ridiculous are the prices at which German machine tools can be bought. The quality is below that of before the war, but to say that they are good for nothing would be wrong. German lathes which were offered us nine months ago for 1200 florins we thought cheap; to-day we can buy the same lathes for 200 florins. The worst of it is that nearly every manufacturer here is buying at present, not because he needs the machines, but because he thinks that even if he does not use them for three or four years they are bargains at present prices. Though it does look as if Holland is getting bargains, we fear that these conditions will really set back our industries for years to come, because the manufacturers will try to use the German machines, and by that action they will postpone use of the more modern production methods.

"Though not to quite such a large extent, the same conditions exist in Belgium. The Belgian manufacturers, and some of the French as well, are sending their representatives to Germany and buying what they can get at very cheap prices, because of the low ratio of exchange between German currency and Belgian and French francs. This German dumping has, in the case of many manufacturers, put an end to the purchase of American machine tools from the regular agents. There are, of course, a number of Belgian and French industrialists who, even if they could get it for nothing, would not buy German machinery, but a large percentage consider that 'business is business' and buy where they can get what they want the cheapest.

"You will see from the above that what happens at present in the central countries is a puzzle, no matter from which side you look at it, but what we know for sure is that at present it makes a regular business in American machine tools an impossibility."

Plan to Help Germany

WASHINGTON, Jan. 27.—The *Hamburger-Fremdenblatt* publishes a report, according to word received by the Bureau of Foreign and Domestic Commerce, that a large German-American syndicate has been formed with branches in New York and Hamburg, for the purpose of supplying raw materials to Germany. It is said that the syndicate has the support of the leading banks and financial institutions in America and Germany, and will ultimately have several hundred million dollars at its disposal.

The raw materials supplied to Germany are to be paid for in part by the export of German goods. The German organization necessary for this part of the undertaking is now being brought into life. German industrial shares and acceptance of German banks and industrial concerns will furnish the security for the credits.

Pamphlet Defines Export Terms

The definitions of export terms agreed upon at the conference of trade organizations and chambers of commerce called by the National Foreign Trade Council, Dec. 16, are now available in the form of a small pamphlet. Full definitions, including explanations of the buyer's and seller's obligations, are given of F.O.B., F.A.S., C.&F., C.I.F., L.C.L. The pamphlet also contains a number of general recommendations to manufacturers, intended to avert confusion and misunderstanding. The elimination of superfluous abbreviations and those the meaning of which might not be clear to the foreign buyer is urged, as well as clear weight quotations to avoid misunderstanding as to whether a ton means 2000 lb., 2240 lb. or 2204 lb., and a hundred-weight means 100 lb. or 112 lb.

President Welborn Reviews the Steel Strike

Meetings of Colorado Fuel & Iron Co. Officials and Employees Made Frank Discussion Possible—Industrial Representation Plan Will Be Continued

DENVER, Jan. 24.—The recent strikes of coal miners and steel workers, so far as they affected operations in Colorado, were dictated from outside the State and were for the purpose of securing union contracts and the "closed shop," according to a statement by President J. F. Welborn of the Colorado Fuel & Iron Co. The statement is in the form of a report to stockholders and employees.

Referring to the coal miners' strike, the statement says:

"At the time of calling this strike 16 per cent of the coal produced in Colorado was mined by companies working under contract with the United Mine Workers of America.

"Generally speaking, the mine workmen in this State were satisfied with wages received and with working and living conditions. The diggers, who represent about 50 per cent of the total number of men employed in and around coal mines, were earning from \$5 to \$10, with an average of about \$7 per day. Mule drivers, timbermen and track layers were being paid from \$5.15 to \$5.40 per day. The coal mines of the State had been working practically full time for several months. The mines of the Colorado Fuel & Iron Co. for the 12 months ending with Sept. 30, which included the dull period immediately following the signing of the armistice, worked an average of 270 days. House rent and charges for electric light have not been increased during the last 10 years, the cost of coal consumed by the miners has been advanced very little and the increase in all living expenses at our coal mines since 1914 has not exceeded 50 per cent, which is much less than the general increase throughout the country."

The Steel Strike

Concerning the steel strike, Mr. Welborn's report says:

"The first notice of this strike was served on F. E. Parks, manager of the steel plant, the morning of Sept. 18 by a committee of five of our employees, who showed him a telegram from Secretary William Z. Foster advising the workmen, members of various unions represented in our plant, to present their demands on the company based on 12 propositions contained in Bulletin No. 2 issued by the national committee for organizing iron and steel workers July 30, reading as follows:

The following propositions, adopted by the national committee for organizing iron and steel workers, at the meeting in Pittsburgh, July 20, 1919, will be presented to the big steel corporations as soon as conferences can be arranged between them and the unions. These propositions are general in character and are subject to development when the various organizations prepare their respective trade demands.

- 1—Right of collective bargaining.
- 2—Reinstatement of all men discharged for union activities, with pay for time lost.
- 3—The eight-hour day.
- 4—One day's rest in seven.
- 5—Abolition of 24-hour shifts.
- 6—Increases in wages sufficient to guarantee American standards of living.
- 7—Standard scales of wages for all crafts and classifications of workers.
- 8—Double rates of pay for all overtime work and for work on Sundays and holidays.
- 9—Check-off system of collecting union dues and assessments.
- 10—Principles of seniority to apply in maintaining, reducing and increasing working force.
- 11—Abolition of company unions.
- 12—Abolition of physical examination of applicants for employment.

The Company's Answer

"As to the above propositions:

"No. 1 exists under our industrial representation plan.

"No. 2—Men are neither discharged nor discriminated against because of membership in unions.

"Nos. 3, 4 and 5 have been in effect since November, 1918.

"No. 6—Our wages are at least as high as those paid in similar operations elsewhere. They were advanced 130 per cent during a period of three years, and compare favorably with wages paid in other lines of employment.

"No. 7 involves disregard of qualifications of workmen.

"Nos. 8, 9 and 11 have direct relation to proposed union contracts. We were already paying time and one-half for all overtime.

"No. 10 is considered by us along with qualifications of workers.

"No. 12 could not be adopted without impairing efficiency of working forces and greatly increasing dangers of disease and accidents.

"No dissatisfaction with working conditions or wages had previously been expressed by employees. At a regular conference between employees' representatives numbering 42, and company officials, held Sept. 17, the day before this strike notice was served on us, the usual matters considered at such meetings were brought up and disposed of in a way said by the representatives to be satisfactory, and there was no intimation of an impending strike.

Meeting with Employees

"After receipt of the strike notice the following day the 42 employees' representatives were asked to meet again with company officials, including the president, for the purpose of discussing it. It was apparent that there was general surprise on the part of the representatives that a strike had been called and a lack of understanding by them as to the reasons for it. On their own initiative, and not in answer to questions, they stated that working and living conditions have improved under the operation of the industrial plan and were satisfactory; that they received uniformly fair treatment at the hands of company officials; and that the essential propositions contained in Bulletin No. 2, except those that had to do with the desire to establish union contracts and the 'closed shop,' having already been adopted by the company, there was no reason for the strike. There was admission by some, however, that they had no option but to obey the strike call of the union officers. A few stated that they and others desired trade union agreements between the company and the various crafts, and after acknowledging the existence at our plant of most of the 'twelve proposition' referred to, said: 'The nub of the whole question is recognition of the union.'

"This meeting lasted four hours, and following it another meeting was had with the committee which had served the strike notice. When advised that we were willing to discuss any of the points brought up that did not involve discontinuance of our industrial plan, or the establishment of the 'closed shop,' one of the committee answered that nothing could be considered except complete acceptance or rejection of the 12 points, and repeated what had been said at the previous meeting, that 'the nub of the whole question is recognition of the union,' with the further statement that they were willing to test strength with the company on that proposition.

Closed Shop Demanded

"The meeting lasted an hour, with a continuous effort on the part of company officials to establish a basis of negotiation that would avert the calling of the men out on strike. The committee, however, refused to withhold issuing the strike call, unless the company ac-

cepted the 'twelve propositions,' which, as they stated, meant the signing of trade union agreements and the 'closed shop.' They stated that they had authority to accept nothing less than the 'twelve propositions' considered as a whole.

"The officers felt that in the interests of the stockholders and the employees they could not accede to these demands, and so advised the strike committee, with the result that the strike call was issued. It was our belief that less than half our employees belonged to unions represented in the plant, and that a far less number were in favor of the strike, but that, as is the usual habit among workmen, many, if not most, of those opposed to the strike would for various reasons stay away from work. Our views were confirmed by a failure of any considerable number of men to report for work on Monday morning, Sept. 22, and the plant was closed down.

Back to Work Movement

"Within 10 days thereafter, however, our employees formed a 'Back to Work Organization,' and asked for a meeting of its committee with the manager of the plant. This meeting was granted, it being composed of about 45 of our former employees, who presented the following declaration of principles:

I am a member of the Back to Work organization.

I was satisfied with conditions as they existed at the Minnequa plant of the Colorado Fuel & Iron Co. before the strike was called for Monday morning, Sept. 22, 1919.

Moreover, I am ready and willing to return to work at the said mill, on the same job at which I was working whenever the Back to Work organization attains such a membership as to make it possible for the said company to reopen and operate its plant.

"Other meetings with this committee and additions thereto, which finally reached a total of 200, were held at least once per week thereafter. The sentiment in favor of returning to work had so developed that the plant could have resumed operations in October, except for the then impending coal strike, which made it seem desirable to postpone that action. The coal strike called for Nov. 1 did not seriously affect our coal production, but the entire output of our mines was immediately commandeered by the Government for emergency domestic requirements in new territory, and the railroad administration declined to permit us to use any of it for the steel plant until Dec. 15, on which date operations there were resumed.

Shortage of Rail Orders

"Shortage of rail orders, except those placed by the railroad corporations for shipment after the roads are returned to their owners March 1, made it necessary to delay starting the rail mill, and consequently delay firing up some of the furnaces. Because of this condition we were unable to re-employ men as fast as they applied for work, but when the strike was called off Jan. 9 we had approximately two-thirds of the normal force on the pay roll working in the merchant mills, wire mill and at those furnaces necessary to supply these mills with steel. The remaining furnaces and rail mill will be put into operation the latter part of January, and all departments will be in full operation before the end of February.

Manager Fired Upon

"Although picketing was general at all entrances of the plant, no violence was attempted until during the second week of operations, when women from some of the foreign families commenced to pelt the men with stones as they left their work. Later, Mr. Parks, manager of the plant, was fired upon several times one evening while on his way home. Immediately following the attack on Mr. Parks a small number of State militiamen were sent to Pueblo in response to request on the Governor made by a committee of Pueblo business men, and order was immediately re-established.

Industrial Plan Continued

"There has been, and will continue to be, strict compliance with that provision of our plan of industrial

representatives of employees reading as follows:

There shall be no discrimination by the company or by any of its employees on account of membership or non-membership in any society, fraternity or union.

"This provision is in harmony with the 'open shop' idea, but not with the 'closed shop,' and it is the belief of the managing officers of the company that it is to the interest of the stockholders and employees, as well as to that portion of the public which we serve, that the principles of collective bargaining without discrimination, which our industrial plan provides, should prevail in our industry. Many of our employees are opposed to joining unions, and have sought employment with us because of our 'open shop' policy and favorable working conditions. Consideration of these men alone would require that we refrain from signing contracts, the final result of which would be the forcing of these employees to join the union against their will.

"In considering this, it is well to take note of the fact that practically all of the coal produced in the United States during the period of the recent coal strike came from mines not under contract with the union.

"Neither of these strikes resulted from dissatisfaction on the part of workmen with the conditions under which they were working at our properties, and neither was dictated by the workmen.

"The statements of the union officers responsible for the calling and direction of both strikes made it clear that two primary objects were sought in Colorado. One was the forcing of union contracts and the 'closed shop,' and the other was the abolishment of our industrial representation plan.

"The feeling of mutual confidence established between the officers of the company and the workmen, through the operation of the industrial plan, formed the basis for a frank discussion of the motives that dictated these strikes. Their expressions in meetings and their actions after the strikes were called, demonstrated that by an overwhelming majority the workmen were opposed to the strikes and satisfied with the methods of representation and collective bargaining practised in our operations.

"It is the hope of the management that the co-operative spirit which brought the officials and workmen together in these trying situations will continue with increasing importance in all their relationships."

Strikes Called in Building Trades Controversy

The attempt of the Building Trades Council to force the Iron League Erectors' Association to recognize the union of iron workers in New York, culminated immediately after Jan. 1, in the calling of a general strike on two building projects; one in Brooklyn; the other in New York. The two companies affected by the strike are the Levering & Garrigues Co. and the George A. Fuller Co. The total number of men on strike is said by the Iron League Erectors' Association to be 50. The employers believe this move to be only for the purpose of making good on several threats to call a general strike unless the union is recognized.

Senator Kenyon's Plan

WASHINGTON, Jan. 27.—Another effort to work out the solution of the industrial situation through a conference is represented in a concurrent resolution introduced in the Senate by Senator Kenyon of Iowa, chairman of the Committee on Education and Labor. The resolution, which provides for the calling of a national industrial congress by the President of 150 delegates representing employers, 150 representing employees and 50 representing the public, is expected to be favored by some of the spokesmen of organized labor.

Besides providing for the calling of an industrial congress, the resolution directs the President to create a labor adjustment board, similar in its composition to the former War Labor Board, which passes upon industrial disputes pending action of the national industrial congress. It is provided that the National Labor Board, as the adjustment body is to be known, shall immediately proceed to function under the principles and prece-

dents established by the former War Labor Board. It shall receive for adjudication either ex-parte complaints or joint submissions from employers and employees, or it may institute proceedings in any controversy on its own motion or at the direction of the President or of Congress. It shall establish in the leading industries by conference and agreement, joint membership in the adjustment of labor disputes, and such other practices as it may deem proper for the advancement of industrial peace and the public welfare.

Definite provision is made for the selection of the various groups.

German Shop Councils Bill

The shop councils bill, otherwise known as the "exploitation law," one of the most radical pieces of economic legislation since the war, was passed by the German National Assembly Jan. 18, and affects all places where more than five men or women are employed, excepting newspapers. The five or more employees elect a steward, who will confer with the employer on the relations with the workers and the general conduct of the business. The number of stewards varies proportionately to the size of the staff, whose representatives now will be given the privilege of attending directors' meetings, where they will be active voters although not shareholders.

A foreman or department chief may be forced to quit, regardless of his services to his employer. This feature was stubbornly fought by the big business interests.

In the World of Labor

Pattern makers in the six job pattern making shops in Toledo, Ohio, have struck for an advance in their minimum wage from \$1 to \$1.25 per hour.

Announcement has just been made by the Westinghouse Electric & Mfg. Co., East Pittsburgh, that hereafter all workmen who have been in the employ of the company 10 years, will be given a week's vacation each year with pay. The pay for the vacation period will be based on the average of the preceding three months' earnings of the employees.

The Library Employees' Union, 463 Central Park West, New York, has issued a pamphlet on Industrial Democracy, a study help, showing that methods of joint operation of industry has been in force a great many years in many countries, and that as long ago as 1886 the shop committee was outlined by the late James C. Bayles, then editor of THE IRON AGE. The pamphlet is a careful compilation which will be of service to anyone studying this subject.

Machine Tools for Poland

WASHINGTON, Jan. 27.—Trade Commissioner Wilbur J. Page reports to the Bureau of Foreign and Domestic Commerce that machine tools, turbines, dynamos and other technical implements are among articles which are extremely scarce in Poland.

To facilitate the importation of these and other needed commodities, a new commercial house has recently been established in Warsaw under the designation of the First Polish Importation and Exportation Co., Ltd. The subscribed capital has been brought up to 20,000,000 marks and may be increased to 50,000,000 marks. The new company will undertake to provide material for the Army, railway services and waterways of Poland and will further undertake to supply the requirements of state factories and offices.

Plans are being drawn by the Gorham Mfg. Co., Providence, R. I., for a two-and-a-half-story employees' recreation building, to cost approximately \$200,000. The building will contain an auditorium. According to present plans, the project will be started next spring.

The Texas Oil Co. has completed a \$1,000,000 oil storage service, consisting of five tanks, with a capacity of 150,000 bbl. Oil is brought to Mobile by the company steamers from Port Arthur.

DEMAND FOR MALLEABLES

Foundries Unable to Turn Out Castings Fast Enough—Sliding Scale Contracts

Malleable castings are in abnormal demand in the Central West owing to the heavy requirements of the automobile manufacturers, and consumers are having great difficulty in placing orders that under normal conditions would be of the most attractive character. Many malleable foundries have the capacities of their plants booked for six months or longer and some contracts are being taken for delivery in six or eight months. During the past few days one Detroit automobile company has been trying to place 500,000 malleable iron hubs, but, as far as known, the foundry has not been found that is in a position to take this desirable order. Another consumer has been inquiring for 500 to 1000 tons of malleable castings for motor trucks, but without success, and was advised to get in touch with some of the malleable foundries in the East which are not so badly crowded with work as those in the Central West and consequently can make better deliveries. The demand for malleable castings from the railroads has improved, being mostly for repair work. Some demand has sprung up from car builders having export car orders. The demand from the agricultural implement makers, which has been light for several months, is picking up.

Malleable foundries throughout the country are now getting out about 80 per cent of their normal production, but this means less than 80 per cent of capacity. There is a shortage of molders in most sections but the supply of common labor is somewhat easier, this being attributed to the fact that some labor drifted from the steel mills to the foundries during the steel strike.

The plan of making sliding scale contracts with quarterly adjustment on prices based on the cost of pig iron and labor has been adopted generally recently by the malleable foundries, although there is a lack of uniformity in the details of these contracts. Most of the automobile manufacturers have made yearly contracts subject to these quarterly adjustments. In the past malleable foundries have often suffered by making long-term contracts at fixed prices because of an advance in the price of pig iron and labor after the contracts were taken.

Steel foundries report an improvement in orders, but the demand for steel castings is apparently not sufficient to operate the steel foundries to capacity. The heavy demands of the Government for steel castings during the war resulted in a very large increase in the steel foundry capacity of the country and the normal requirements of consumers apparently have not yet caught up to this increased capacity.

Westinghouse Geared Turbines Ordered for New Ships

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has received contracts from the Merchant Shipbuilding Corporation for the propelling machinery for two new ships being built in the yards of that company at Chester, Pa., for the Shawmut Steamship Co. These ships, which are designed for general cargo service, will be of about 10,000 tons dead weight, and are to have a speed of 13 knots. Propelling equipment of each will consist of a 4200-shaft-hp. cross-compound Westinghouse turbine, of the latest type, which will drive the single propeller through double-reduction gears. An oil-relay governor will be provided which will prevent the propeller from racing, even in heavy seas, but will at no time shut the turbine down. As there will be two separate turbines, high pressure and low pressure, and either can be operated independently in an emergency, the danger of crippling the ship by an accident to the machinery is very remote.

The number of furnaces in blast in Belgium on Dec. 1, 1915, was 12, against three on July 1, and 48 before the war.

Belgians May Buy Rolling Stock in Canada

TORONTO, ONT., Jan. 24.—Belgium is contemplating the purchase in Canada of 18,000 20-ton freight cars and 50 locomotives. The amount of money involved in these orders is indicated by the fact that the freight cars alone will cost in the neighborhood of \$2,000 each, or a total of \$36,000,000. The placing of the order is conditional upon prices being satisfactory and upon the acceptance of treasury bonds of the Belgian Government bearing interest at 5½ per cent and redeemable in five years in payment for the equipment. That being so, the question now under consideration is the manner in which the orders shall be financed on this side of the Atlantic, that is to say, the amount of the credit the Dominion Government shall furnish upon the security of the Belgian treasury bills. When the Government took over at the end of the year the unexpected balance of credits established for France, Belgium, Rumania and Greece, it was decided that in future Canadian companies would have to arrange a portion of the credits required to finance their foreign orders. It is understood that the car and locomotive companies interested in the proposed Belgian orders are suggesting that the Canadian Government should furnish credits to the extent of 50 per cent of the amount involved, while the Government contends that the companies should establish credits to the amount of five-eighths of the sum required. The question of credits is now before the finance minister. If the equipment can be furnished at satisfactory prices and credits are established, the orders for cars and locomotives will be distributed among the Montreal Locomotive Works, Montreal; the Canadian Locomotive Works, Kingston, Ont.; the Canadian Allis-Chalmers Co., and the Canadian Car & Foundry Co., Montreal; the National Steel Car Corporation, Hamilton, Ont., and the Eastern Car Co., Trenton, N. S. The companies interested state that if the orders are placed 80 per cent of the cost of labor and material will be distributed in Canada.

British Iron and Steel Output in 1919

(By Cable)

LONDON, ENGLAND, Jan. 23.—The December production of pig iron was approximately 640,000 gross tons and the steel output 680,000 tons. This brings the 1919 British pig iron output to about 7,370,000 tons and the steel ingot production to about 7,880,000 tons. This compares with 10,260,000 tons of pig iron and 7,664,000 tons of steel ingots in 1913. The 1918 production was 9,072,000 tons of pig iron and 9,591,000 tons of steel ingots.

Financing the Wire Combination

The details of the financing of the Wickwire-Spencer Steel Corporation, the consolidation of the Wickwire Steel Co., Buffalo, and the Clinton-Wright Wire Co., Worcester, Mass., have been announced in connection with the offer of \$12,500,000 first mortgage 7 per cent sinking fund gold bonds and \$7,500,000 first preferred 8 per cent cumulative stock. The bonds and first preferred stock offered represent the entire authorized issues. The common stock is divided into two classes. The 80,000 shares of class A were paid to the Wickwire interests in exchange for their ore lands, and are entitled to cumulative dividends "at the rate of \$4 per share per annum, but no more." Of the 250,000 class B common shares, 150,000 shares represent the holdings in the present common stock of the Clinton-Wright Company and 100,000 are held by the Wickwires.

The statement is made in connection with the offers that the average sales of the constituent companies during the last three fiscal years ended on or before April 1, 1919, have been over \$21,300,000, while current sales are at the rate of \$30,000,000 per annum, and it is estimated that the sales for 1920 will be in excess of \$35,000,000. The average net profits for these three years, after adequate maintenance, but before depreciation and Federal taxes, have aggregated \$3,472,049. From these profits has been charged to depreciation the average sum of \$602,597. The land, buildings, machinery, equipment and other quick assets are appraised

at \$20,117,000, and the net quick assets are \$9,564,302.

Named as among the directors of the Wickwire-Spencer Co. are: Harry W. Goddard, chairman of the board of the Clinton-Wright Wire Co.; T. H. Wickwire, president; T. H. Wickwire, Jr., vice-president and treasurer, and Ward A. Wickwire, vice-president and secretary of the Wickwire Steel Co.; George M. Thompson, president, and Frank Kilmer, treasurer of the Clinton-Wright Co.; L. W. Robinson, president of the Rochester & Pittsburgh Coal & Iron Co.; Frank A. Drury, president of the Merchants' National Bank, Worcester; Paul B. Morgan, president and treasurer of the Morgan Construction Co., Worcester, and R. B. Young, vice-president of E. H. Rollins & Sons, New York and Boston.

Buying Locomotives on Time

WASHINGTON, Jan. 27.—A proposal that an American firm furnish locomotives for Jugo-Slavia without payment of any of the purchase money for a period of three years is discussed in the "Pravda" of Belgrade for Dec. 11. A translation of it has just been received by the Bureau of Foreign and Domestic Commerce. This article says:

"The Government has received very favorable offers for the delivery of locomotives, notably from a large American firm. The state should make an agreement with this firm, by which it would be bound to furnish us, in six months, at least 100 new locomotives according to our specifications to run on our tracks. The firm does not ask our government to start payment on these locomotives until three years after the signing of the agreement. During all this time the state will not even be obliged to pay interest. The liquidation of the debt and the payment of interest will not begin until the end of the third year. So we will obtain immediate possession of the locomotives, which are an absolute necessity to us, without having to pay any of the purchase money for three years. Because of the material advantage which these offers hold out to our country, the government has decided to treat with this house through M. Zlatkovitch, Under Secretary of the Ministry of Communications."

New York Steel Treathers' January Meeting

The New York chapter of the American Steel Treathers Society held its regular January meeting, Wednesday evening, Jan. 21, at the Bush Terminal Building, Forty-second Street. The papers on carburizing included one by H. H. Harris, of the Quigley Furnace Specialties Co., New York, who confined himself to a presentation of the present status of the pot and box industry. An abstract of this paper will appear in a later issue of THE IRON AGE. At an informal dinner at the Cafe Boulevard, preceding the meeting, the following original song was received with considerable enthusiasm:

THE HARDENER'S LAMENT

(Tune—"Good Old Summer Time")

In the old steel treating line,
In the old steel treating line,
Pushing through ten tons of it
And getting it all prime.
I hope the steel is what I think,
For 'twould be a horrible crime,
If her carbon's under twenty-one
And her sulphur forty-nine.

In the good old heating time,
In the good old heating time,
Strolling through the critical range
Me and pyrometer mine.
I hold the needle on the dot
And all seems so very fine.
But if the couple's on the blink,
I surely will get mine.

In the good old hardening time,
In the good old hardening time,
Fixing baby for her bath
In a little tub of brine.
She takes her dive, kicks up a fuss
And makes one terrible whine,
And when I find she's gone in two,
For another job I pine.

W. H. Eisenman, executive secretary of the national organization, was present and delivered an address at the evening session.

SERIOUS CAR SHORTAGE

Director Hines Tells of Orders Given to Relieve the Situation

WASHINGTON, Jan. 26.—The car shortage situation, which has tended to retard steel production, has been given consideration at numerous conferences of officials of the Railroad Administration during the past week.

Walker D. Hines, Director General of Railroads, states that the Railroad Administration will make every effort to meet the present conditions but warns that the car shortage is certain to continue during the next two months. Discussing the steps taken to utilize the car supplies in the most efficient manner, Mr. Hines said: "To make the inadequate amount of equipment go as far as possible, the Railroad Administration has pooled equipment; made use of the permit system in order to avoid accumulations; appointed special terminal committees to speed up the movement of freight; during the prevalence of difficult situations in the wheat-growing territory has given preference to the loading of wheat on the ground; placed the refrigerator car supply of the country under one agency; given coal preference for loading in open-top equipment; eliminated circuitous routes as far as practicable; transferred locomotives at different times to the portions of the country where they were needed most, has given special attention through centralized agencies to take care of seasonal requirements and in every way has tried to make car equipment and locomotives available do the greatest possible amount of service.

"The problem has been intensified by the falling off in loading per car from 1918, when under pressure of the war very heavy loading was secured. The loading per freight car fell from an average of 29.2 tons in the first 11 months of 1918 to 27.8 tons for the same period of 1919, or a decrease of 4.89 per cent, this representing a loss of more than 105,000 cars available for loading. This falling off has occurred in spite of continued efforts of the Railroad Administration, assisted by the co-operation of many shippers. Nevertheless, the Railroad Administration proposes to continue to utilize to the end of Federal operation all the advantages given by unified control."

Will Combat Radicalism

The Associated Industries of Massachusetts has established a speakers' bureau, for the purpose of providing speakers free of charge, except, perhaps, for the expenses of attending the meeting, to combat the wave of I. W. W. propaganda which has been encountered in the New England factory and shop. The Associated Industries has issued the following statement:

"Our executive committee feels that the time has come for us to create a strong speakers' bureau, through which we can not only counteract the false propaganda of the forces of unrest, but build up a constructive propaganda which will establish the credit of industry with the people. Every day various organizations have meetings at which college professors, parlor socialists, labor leaders, politicians and other well-meaning and ill-meaning theorists who were never inside a factory or never employed a man, discuss industrial questions and have their remarks reported in the newspapers. One of our primary objects is to teach the people the facts underlying our great industrial problems."

The organization has enrolled a long list of speakers who stand ready to talk on the following and other subjects:

"Employees Representation or Shop Committee Systems," "Fifty Years of Human Progress in Our Industries," "Employees as I Have Known Them," "A Year's Activities for the Human Side in a Great Industry" (illustrated with lantern-slides), "Fifty-four Years as an Industrial Employee," "How to Organize Employees," "Organization in Accident Prevention," "Practical Americanization Work," "Good Will," "Some Industrial Problems," "Backgrounds of Our Foreign Folks," "The Trend of the Americanization Movement," "Citizenship the Goal of Americanization," "The Foreman's Big Opportunity," "Thinking Straight in Industry," "New Relations of Capital and Labor," "The Soul of Business," "Some Essentials of Efficient Management," "The Golden Rule in Industry," "Cost and Wage Setting," "Paper Making," "The Human Equation in Industry, or the Worth of a Man," "Opportunity," "Swapping Responsibility for Team

Work," "The Employee Is a Salesman," "Make Friends with Your Job," "Everybody's Boss," "Personal Problems," "What the Present Day Employee Gets in His Pay Envelope Besides Dollars," "Civics," "Class Rule," "Industrial Housing," "Housing Reforms" and "The Housing Shortage and What Some Industries Are Doing About It."

Included in the list of speakers are the following: Sidney W. Ashe, General Electric Co., Pittsfield; Ralph Barstow, sales promotion manager, Greenfield Tap & Die Co., Greenfield; F. P. Cox, manager Federal Steel Works, General Electric Co., West Lynn; Dr. E. C. Gilbert, Chapman Valve Mfg. Co., Indian Orchard; C. H. Norton, Norton Grinding Co., Worcester, Mass.; Charles E. Sanders, Parker Wire Goods Co., Worcester; and Solon Wilder, Central Oil & Gas Stove Co., Gardner. Application for speakers should be made to the Associated Industries of Massachusetts, 1024 Kimball Building, Boston.

IRON ORE OUTPUT

Decrease in 1919 Compared with 1918—Lake Superior Mined 86 Per Cent of Total

WASHINGTON, Jan. 27.—Preliminary estimates of the Geological Survey show that the iron ore mined in the United States in 1919, exclusive of that containing 5 per cent or more of manganese, amounted to 60,466,000 gross tons, a decrease of 13 per cent as compared with 1918.

The shipments of ore from the mines in 1919 are estimated at 56,319,000 gross tons, valued at \$203,274,000, a decrease in quantity of nearly 22 per cent and in value of nearly 17 per cent as compared with 1918. The average selling value of the ore per gross ton at the mines for the United States in 1919 was \$3.60; in 1918 it was \$3.39. The stocks of iron ore at the mines, mainly in Michigan and Minnesota, apparently increased from 8,471,507 gross tons in 1918 to 12,986,000 tons in 1919, or 53 per cent.

These preliminary figures are based on returns from producers of nearly 97 per cent of the normal output of iron ore and were supplemented by estimates covering the remainder of the output.

Closing down of blast furnaces by steel and coal strikes had its effect upon iron ore production. A strike of ore handlers at Great Lakes ports also retarded production for a time.

The Lake Superior district produced 86 per cent of the iron ore mined and shipped in 1919. In this district a total of 52,126,000 gross tons was mined and 48,463,000 tons was shipped, decreases of 13 and 22 per cent, respectively, as compared with 1918.

The ore shipped from the Lake Superior district in 1919 was valued at \$179,485,000, a decrease of about 16 per cent. The mines in Minnesota furnished 71 per cent of the total iron ore shipped from the Lake Superior district and 61 per cent of the total of the United States. The average selling price of the ore at the mines in the Lake Superior district in 1919 was \$3.70 a ton; in 1918 it was \$3.46. The stocks of iron ore in this district apparently increased from 7,856,710 gross tons in 1918 to 11,887,000 tons in 1919, or 51 per cent. The shipments of iron ore by boat from the Lake Superior district in 1919, according to figures compiled by the Lake Superior Iron Ore Association, amounted to 47,177,395 gross tons, a decrease of 23 per cent as compared with 1918.

The southeastern states, which form the second largest iron ore producing area, including the Birmingham and Chattanooga districts, mined 5,740,000 gross tons of iron ore in 1919, a decrease of 17 per cent as compared with 1918. The shipments of ore to blast furnaces from these states in 1919 amounted to 5,550,000 gross tons, valued at \$15,914,000, a decrease in quantity of 24 per cent and in value of nearly 18 per cent as compared with the previous year. The average selling value of the ore in these states in 1919 was \$2.87 a ton; in 1918 it was \$2.65.

In the northeastern states, New Jersey, New York and Pennsylvania, there was mined 1,814,000 gross tons of iron ore in 1919, a decrease of 2 per cent, and there was shipped 1,522,000 gross tons, a decrease of 15 per cent. The average selling value of the ore in these states was \$4.06 a ton as against \$4.87 in 1918.

PERSONAL

George W. Denyven has been appointed New England representative of the Champion Rivet Co., Cleveland. He started as a boiler maker with Edward Kendall & Sons, Cambridge, Mass. Later he went to South Africa, where he was employed by the Central South Africa Railroad as boiler maker and inspector. On the opening of the Boer War he served about two and one-half years in the field. Later he went to San Francisco and after the earthquake in 1906 returned East and was associated with A. C. Harvey Co., Boston, for about 11 years. More recently he has been with E. P. Sanderson Co., Cambridge, which he will represent in connection with the Parkesburg Iron Co., Rome Iron Mills, Inc., the Pollak Steel Co., Locomotive Firebox Co., and the Champion Rivet Co. His office will be at 141 Milk Street, Boston.

Emanuel R. Posnack has joined A. Hermansen, industrial furnace engineer, New York, having formerly been engineering draftsman with Adams, Lovell, Burlingham, Inc., New York.

F. F. Storms, formerly president of Page-Storms Drop Forge Co., Chicopee, Mass., will be president of a new drop forging company to be known as the Storms Drop Forging Co., Springfield, Mass. This company has secured a site in the eastern part of the city and four or five one-story buildings will be erected at once. The plant expects to begin running about April 1. Considerable machinery has already been bought.

C. F. Berg has become sales engineer of the Connecticut Blower Co., Inc., Hartford, Conn., and will be located in Boston with a force of erecting mechanics for installing blower and exhaust systems in western Massachusetts, Rhode Island, New Hampshire, Maine and a part of Vermont.

J. B. Johnston, formerly manager of the ordnance department, Crucible Steel Co. of America, Harrison, N. J., has been appointed general manager of the Standard Scale & Supply Co., Pittsburgh, railroad track scales and heavy duty industrial scales.

Richard Fitz-Gerald, production engineer with the National Conduit & Cable Co., Hastings-on-Hudson, N. Y., has become associated with Lybrand Ross Brothers & Montgomery, New York.

Lewis H. MacLaughlin, formerly assistant to the vice-president and chairman of the sales committee of E. F. Houghton & Co., Philadelphia, has rejoined the staff of the Fletcher Works, Philadelphia, laboratory apparatus and centrifugal separators, and will apply himself to research and sales promotion work in the centrifugal division. Mr. MacLaughlin was formerly advertising manager of Schaum & Uhlinger, Inc., and Atlas Ball Co. and general sales manager of the Tahara Co. of America. The change took effect Jan. 19.

Thomas Baumgardner, New York, representing the Adam-Britt Co., is on his way to Calcutta, India, where he has contracted to set up a steel plant.

James T. Enes, designer with Perin & Marshall, New York, has joined the Otis Steel Co., Riverside plant, Cleveland.

After 18 years of service with the Hyatt Roller Bearing Co., B. G. Koether has been promoted to the vice-presidency of the organization and will leave Detroit in a short time for Harrison, N. J., where he will have his headquarters as head of the entire sales and advertising departments of the company.

Charles Allen, Greenfield, Mass., has been made a director of the Greenfield Tap & Die Corporation, in place of Arthur C. Button, resigned.

At the annual meeting of the directors of the West Penn Steel Co., Brackenridge, Pa., the following changes in the official staff were made: Joel W. Burdick, president since its organization, was elected chairman, and

John McGinley, general manager since the organization, was at his own request relieved of the active duties of that position and was elected vice-president. Julian Burdick was elected president and general manager. Mr. Burdick and Mr. McGinley will continue to devote their services exclusively to the management of the company.

Frederick J. Brengel has become manager of the Boston Tool & Mfg. Co., Boston, having formerly been works manager of the Bailey Meter Co., Cleveland.

James L. Haynes, recently with the Groton Iron Works, Groton, Conn., has joined the Federal Shipbuilding Co., Newark, N. J.

Arthur G. Henry has resigned as secretary of the American Steel Treaters' Society, 154 East Erie Street, Chicago, and has also severed his connection with the Illinois Tool Works, Chicago, where he has been metallurgist for four years. His acceptance of a position as special representative for the Vanadium Alloys Steel Co., Latrobe, Pa., has necessitated these changes. Mr. Henry will be located at 566 West Randolph Street, Chicago. As secretary of the American Steel Treaters' Society he will be succeeded by W. H. Eisenman, who will combine in one office the duties of executive secretary and secretary.

F. B. Weld, for many years purchasing agent for Richards & Co., Inc., wholesale hardware, 200 Causeway Street, Boston, is soon to sever his connection there and engage in business for himself.

The United Smelting & Aluminum Co. Inc., New Haven, Conn., announces the election of Frederick A. Merliss as vice-president and his appointment as manager of sales. He has been with the company for three years as assistant secretary, and he succeeds L. M. Brile, former vice-president and sales manager.

J. L. Hukill and L. J. Adler have been elected respectively vice-president and treasurer of the Iron Trade Products Co., Farmers Bank Building, Pittsburgh, dealer in ores, pig iron, fuels, refractories, etc., the latter succeeding A. M. Moreland. W. J. Strassburger is president. The company recently increased its stock from \$25,000 to \$200,000 for the purpose of enlarging its activities.

Joseph E. Vincent, Jr., with offices at 55 Liberty Street, New York, has been appointed eastern sales representative of the Massillon Steel Castings Co., Massillon, Ohio, specializing in castings used in the automotive and railroad industries. Mr. Vincent also represents the Peerless Drawn Steel Co., Schwartz-Herrmann Steel Works, Inc., and is owner and general manager of the Iron, Steel, Metal & Alloy Co., New York. In addition to the New York office a branch office is maintained at 120 Franklin Street, Boston, in charge of C. H. Dayton, and within the near future an office will be opened in Philadelphia to take care of the trade in Pennsylvania, Delaware and Maryland.

Daniel W. Kearcher has been elected a director of the Eastern Steel Co., Pottsville, Pa.

F. Rodger Imhoff, New England representative of the Precision & Thread Grinder Mfg. Co., Philadelphia, has recently been made field engineer, with headquarters in Detroit, covering the entire country in the interest of the Multi-Graduated Precision Grinder. Mr. Imhoff is an expert in thread grinding and has written many interesting papers on that subject.

The Blaw-Knox Co., Pittsburgh, manufacturer of steel products, announces changes among officials as follows: A. W. Ransome, formerly manager of the New England territory, with offices at Boston, has been transferred to San Francisco as manager of the Pacific Coast territory with offices in the Monadnock Building, San Francisco. Immediately after leaving college, Mr. Ransome became engaged in construction work and in the construction machinery business until 1917, when he became associated with the Blaw-Knox Co. O. A. Olstad, formerly with the New York office, has been made manager of the New England territory, with offices in the Little Building, Boston.

The Brier Hill Steel Co., Youngstown, Ohio, an-

announces that, effective Jan. 1, E. J. Kauffman is appointed superintendent of the washed metal department, succeeding T. M. Phillips, resigned. A. G. Egler is appointed superintendent of the open-hearth department, effective Jan. 1, succeeding H. B. Barnhart, resigned.

W. P. Starkey, vice-president and general superintendent Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa., until his resignation several weeks ago, will in the future devote his attention to a general supervision of the business interests of the Starkey Produce Co. This company, a \$500,000 enterprise, has been formed to conduct farms and orchards in eastern Pennsylvania. Several former iron men are associated with Mr. Starkey in the new enterprise.

C. W. Forcier, Union Arcade, Pittsburgh, has been appointed district representative in Pittsburgh for the Titusville Forge Co., Titusville Pa. Mr. Forcier continues to represent in the Pittsburgh district the Crucible Steel Forge Co., Cleveland, in its line of alloy steel, die blocks and piston rods.

George Braithwaite, who was with the original Stevens-Duryea organization, has severed his connection with western automobile interests and is in charge of manufacture at the Chicopee, Mass., plant of the new Stevens-Duryea company.

At the stockholders' meeting of the Bridge & Beach Mfg. Co., stoves, Jan. 20, the following directors were re-elected: Hudson E. Bridge, Leo H. Booch, Henry C. Hoener, John F. Shepley, Louis H. Riecke, Laurence D. Bridge and George Leighton Bridge. The board elected the following officers: Hudson E. Bridge, president and treasurer; Leo H. Booch, vice-president and manager; Henry C. Hoener, vice-president; Louis H. Riecke, secretary; George Leighton Bridge, assistant secretary; A. F. Gammeter, assistant treasurer; Laurence D. Bridge, assistant treasurer.

W. J. Adamson, for the past three years with the general sales department, the Trumbull Steel Co., Warren, Ohio, has been appointed an assistant general manager of sales. The company has organized a home district sales office which will look after the sales in the territory heretofore taken care of by the general sales department. F. H. Loomis has been appointed district sales manager. Mr. Loomis has been with the general sales department for the past two years.

John Stephens, Jr., has been elected president and general manager of the Mann Edge Tool Co., Lewisport, Pa. J. A. Muthersbough has been elected vice-president; H. R. Manbeck, secretary, and S. B. Weber, treasurer.

The directors of Keuka Industries, Inc., which recently took over the motor factories of the Curtiss Aeroplane & Motor Corporation at Hammondsport, N. Y., are Glenn H. Curtiss, Hammondsport; K. B. MacDonald, Buffalo; J. H. McNamara, Hammondsport; Hugh Satterlee, New York; L. J. Seely, Hammondsport. With the exception of Mr. Satterlee the directorate is composed entirely of men who for years have been connected with the Curtiss Aeroplane & Motor companies. Mr. Seely has been several years sales manager of the Curtiss companies; Mr. McNamara has been manager of the Hammondsport plant since 1912; Mr. MacDonald has been production manager of the Curtiss plant at Buffalo.

A. P. Van Schaick has been appointed assistant general manager of sales of the American Chain Co., as per Jan. 1, with his headquarters at the general sales office, Grand Central Terminal, New York.

Charles L. Bennett, formerly with the Halcomb Steel Co., has been appointed special representative for Ohio for the Armco sales department of the Page Steel & Wire Co. and will handle the company's line of welding and strand wire and iron fence. His office will be in the Guardian Building, Cleveland.

Glenville A. Collins, who formerly represented the Wellman-Seaver-Morgan Co., Cleveland, in Seattle, Wash., has severed his connection with this company due to its discontinuance of this office. He has resumed consulting engineering practice in the L. C.

Smith Building, Seattle, with branch offices at Portland, Tokio and Shanghai. Attention will be given to mining, civil and mechanical engineering and material handling problems. He is also connected with the Collins-Ferguson Co., same address, devoted to domestic and foreign trade in machinery and metal products.

The Sullivan Machinery Co., Chicago, has appointed Louis R. Chadwick, former branch office manager at Spokane, manager of the company's branch at 30 Church Street, New York. Robert T. Banks, for several years with this company as sales manager at its El Paso, Tex., office, has been appointed manager at Spokane to succeed Mr. Chadwick. The board of directors has appointed: Arthur E. Blackwood, formerly manager at New York, to be vice-president in charge of finance and accounting; Howard T. Walsh, vice-president, in charge of sales; Gilbert K. Wilson, assistant secretary, in charge of cost accounting; Nathaniel H. Blatchford, Jr., assistant treasurer; Emil A. Krevis, general auditor; Frederick W. Copeland, manager of foreign sales.

Clarence Overend has been appointed sales manager of the Savage Mountain Fire Brick Co., Frostburg, Md., and is located at room 704, Second National Bank Building, Pittsburgh.

E. B. Pentz has been appointed Cleveland district sales manager of the Whitaker-Glessner Co., Wheeling, W. Va., in the sale of its products, which consist of annealed, galvanized and long-terne sheets.

M. M. Cory has resigned as general manager Giddings & Lewis Co., Fond du Lac, Wis., manufacturer of lathes and other machine tools.

OBITUARY

GEN. CHARLES LAWRENCE PEIRSON, former iron merchant, died at his residence, 191 Commonwealth Avenue, Boston, Jan. 23. He was born in Salem, Jan. 15, 1834. At the close of the Civil War, in which he took a prominent part, with Gen. Robert H. Stevenson, he formed the firm of Stevenson & Peirson, iron merchants, and continued a member of this firm and of its successor, Charles L. Peirson & Co., until his retirement from business about ten years ago. At one time he was treasurer of the Lowell Machine Shop.

GEORGE B. SHERMAN, for about a year on the business staff of The Iron Age Catalogue, died after a short illness from pneumonia on Jan. 20, at his home in Lancaster, Pa., aged 52 years. Early trouble with his eyes swerved him from a plan to follow engineering, having entered the Massachusetts Institute of Technology, but he proved essentially a salesman. For a long period he was engaged in the life insurance business and for about 10 years in the publishing business.

MICHAEL J. HOULIHAN, contractor and financier, died in a private hospital at Providence, Jan. 22 following an operation. Mr. Houlihan was born at Millbury, Mass., Aug. 2, 1860. Among his many business interests he was a director of the Marine Dry Dock & Engineering Co. and treasurer of the Standard Machinery Co.

RIMMON C. FAY, 71, inventor of the Fay lathe, who died recently in Philadelphia, was buried in East Brookfield, Mass., Jan. 20. At the time of his death Mr. Fay was designing machinery for the Fales & Jenks Co., Providence, R. I.

PROF. CHARLES DURLIN BRAY, for 39 years in the mechanical and engineering department, Tufts College, Medford, Mass., died at his home, 98 Professors Row, West Somerville, Jan. 20, of pneumonia.

ALBERT S. HILLS, treasurer of the Haydenville Brass Mfg. Co., Haydenville, Mass., died suddenly from a shock, Jan. 17, aged 60.

HENRY J. RUESCH, president H. J. Ruesch Machine Co., Newark, N. J., died Jan. 12.

ESTABLISHED 1855

THE IRON AGE

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Industrial Representation Continued

The true inwardness of the steel strike is shown in the report of President Welborn, of the Colorado Fuel & Iron Co., published elsewhere in this issue, for it is indicated that in Colorado as in all other States, the real purpose of the strike was to obtain the closed shop. The report is of special interest because it discusses the strike as related to the industrial representation plan which has been in effect in the Colorado company's plant longer than has any similar plan in any other steel plant in the country.

Mr. Welborn shows how before the strike was declared there were prolonged meetings under the provisions of the industrial representation plan and although these meetings did not result in preventing the strike, they did bring about a better understanding between the employers and employees than would have otherwise been possible. The meetings brought out the frank admission that "the nub of the whole question is recognition of the union."

Mr. Welborn points out that within ten days after the strike was declared, employees of the company formed a back-to-work organization and resumption of operations would have been possible in October except for the impending coal strike. The Railroad Administration declined to permit the company to use any of the coal for the steel plant until Dec. 15.

Mr. Welborn announces that the policy of the company not to discriminate against any employee on account of membership or non-membership in any society, fraternity or union will be maintained in harmony with the open shop policy of the company and he gives some very excellent reasons for this policy. Perhaps the most important declaration is one of adherence to the industrial plan, in which he still has faith. He says that the feeling of mutual confidence between the officers and the workmen resulting from the operation of this plan formed the basis for a frank discussion of the motives that dictated the strikes and brought out some important facts concerning the opposition of the workmen to going on a strike. He expresses the hope that the co-operative spirit developed through recent trying experiences will continue

with results of increasing importance. There certainly is a basis for this hope.

Critics of employee representation will find nothing to comfort them in the statement of President Welborn. On the other hand, those who believe that a change for the better in the relation of employers and employees can be brought about by such efforts as have characterized the Colorado Fuel & Iron Co. and other companies will be encouraged by the history of the strike in Colorado.

Efficiency in Railroading

The loose talk that has been indulged in so freely of late, suggestive that the railroads are soon to become large buyers indiscriminately of cars, locomotives and rails should be discouraged. The country requires better transportation service than it has been receiving; but for two reasons, because the railroads have grown to such size and because the costs of supplies, equipment and labor are so high, there is an imperative need for greater efficiency in railroading. There is no particular reason to doubt that this fact is well recognized by railroad managers. Prominent railroad men are not responsible for the talk which one has heard so much about the railroads being about to rush up to the counter and buy. Rather they have endeavored to discourage such talk.

When one considers the large proportion of the working population of the country that is engaged in operating the railroads or purveying in one way or another to the railroads, it is readily seen that the people cannot afford to devote so much of their time and energy to this one of the country's necessary activities unless the service cannot possibly be rendered with less expenditure of time and energy. If greater efficiency can be brought about, it is imperative that this should be done.

When the greatly increased cost of a freight car is considered, it is obvious that it is not well to continue adding blindly to the number in service when their average useful travel is 19 miles per day. It is equally clear that when locomotives, track and labor are so costly, it is not efficient that old cars, far below the modern standard, should be kept in service, making extravagant use

of locomotive and human effort and of track space and endangering train movement by their liability to break down entirely. Similar observations can be made as to locomotives, while as to track railroad men have no doubts that more automatic signaling of track is required to a much greater extent than additional miles of track.

That the transportation needs of the country have increased more rapidly than the ability of the railroads to furnish the service is commonly admitted. The term "transportation needs," however, is a very broad term. It does not follow that all that is needed is for the railroads to be able to haul more ton-miles per annum. The ton-mile figures look well in monthly and annual totals, but they tell nothing of the heartaches the shippers and consignees may have experienced during the year. The goods may be shipped Jan. 1 and received either Jan. 15 or April 15—it is all the same in the ton-mile statistics of the year.

There has been much discussion as to freight rates, whether rates should be advanced, and how much. Computations have been made as to how much freight there is in given articles when purchased by the ultimate consumer. In a pair of shoes, for instance, there is 25 cents of freight, from the steer on the ranch to the shoes in the retail store. Now the amount of money that is paid to the railroads is one thing and the total cost of maintaining a supply of goods at the point of consumption instead of the goods being at the point of production is a different and a much larger item. The consignee has large expenses due to maintaining stocks against the uncertainties of railroad service and to losses due to failure of goods to arrive when expected. Those are costs to business but they are not represented by rates paid to railroads under tariffs approved by the Interstate Commerce Commission. There are many buyers of goods received by rail who would be glad to pay 25 or 50 per cent higher freight rates if at the same time they were given assured service, a certainty that every lot of goods ordered would be the same length of time in transit. The real economic need of the country is not of more ton-miles so much as of better service, and for that the country is willing to pay, if necessary.

Price advances of pig iron and steel have been more sensational in Germany than in probably any other large producing country, due in part of course to the depreciated currency. Hematite pig iron which sold for 79.50 marks per metric ton in July 1, 1914, had advanced to 1171.50 marks on Dec. 1, 1919. Steel bars selling at 98 marks in 1914 have lately commanded no less than 3000 marks per ton, and so on through the list. In most cases, if figured at the present rate of exchange, values are less than they were before the war at normal exchange. In the case of spiegeleisen, considerable of which has been bought from American producers for German consumption, the present German price is \$215 per ton at normal exchange or \$12.54 per ton at the present value of the mark. To obtain this American product at the price of \$45 to \$55 per ton, furnace, ruling here, German consumers evidently have had to pay much more than the German price. The movement of several

thousand tons to Germany from this country is strong evidence of her lack of raw materials.

Prices at Birmingham

It is more than an incident that foundry pig iron has been selling in recent weeks at substantially the same price f. o. b. Birmingham furnaces and f. o. b. various furnaces in the Central West. The best test of a market, when the market is an open one, is prices, and the pig iron market has certainly been wide open. The circumstance is admissible testimony to there having been a change in the alignment as to productive capacity and consumptive requirements.

The present market situation may be considered illogical by those whose chief guide is precedent. In the past Southern iron always sold at prices well below Northern prices, the Southern iron penetrating far North to various zones in which delivered prices were equalized, the freight on the Southern iron being from \$2.50 to \$3.50 less than the freight from the nearest Northern furnace to the same point of delivery.

There was a time, many years ago, when consumers of pig iron in Pittsburgh bought Birmingham iron, the Pittsburgh market therefore being the Birmingham price plus the freight. At the same time, a steel consumer in Birmingham bought steel made in Pittsburgh, the market price of steel in Birmingham being the Pittsburgh price plus the freight. Such an alignment of the market was certainly illogical, and was marked for readjustment by the laws of trade.

The readjustment has now been accomplished very largely. A greater portion of the pig iron produced in the South is converted into steel in the South, while the total production of pig iron has not increased in the same ratio as has the production in the North, or particularly in the Middle West, including Buffalo. The consumption of foundry iron in the South has also increased.

Industry Asked to Help Colleges

American industry should be more greatly concerned over the conditions confronting our institutions of learning than apparently it is. Before the war the increasing emoluments in business life were diverting from the instructing staffs of our colleges many who were well equipped to be the teachers and leaders of thought for our youths. The rapidly advancing living costs since then and the inability of our schools to meet the conditions have so accentuated the disparity between salaries in the college and out of it that many active campaigns are now in progress for increasing school endowment funds. Just as it was necessary to call attention in emphatic terms, years ago, to the need of training skilled help for our factories, so is it now, with the likelihood of large crops of inadequately trained college graduates, to point to the forces now tending to lower the caliber of individuals doing the teaching. Men who have long devoted themselves to the teaching profession have remained in their chosen walk of life in spite of the adverse cir-

cumstances, but it has been difficult latterly to keep up the standard in the new accessions to the teaching profession.

It is not merely in engineering schools that the manufacturing industry needs to be interested. Business generally is increasingly dependent upon the trained minds, which ought to be available both in numbers and capacity, and no argument is needed to back up the assertion that among teachers we need the broadest type of individuals it is possible to attract into the profession. It is not surprising that strong appeals are accordingly made to our healthy industrial companies to contribute to these endowment funds. Many of these companies have achieved success through the work of their trained employees, and they are asked not merely to help pay for the success, but to strengthen the foundation for a continuation of it.

Recognizing the somewhat intangible basis on which such donations would be sought, some of our engineering colleges, for example, have tried to approach the problem in a practical way and have offered to contract with companies which are likely to need the laboratory and research services. Thus, Cornell University, to mention one case, and the Massachusetts Institute of Technology have drawn up forms of contract under which certain help can be given in specific directions in return for a lump sum or an annual subsidy, so to speak, of the technical facilities of the institution. It will be a serious thing for American industry if adequate salaries cannot be offered to the members of the teaching profession, and it is called on to help the individual graduates of those institutions in raising the large sums of money necessary.

Renting Houses at a Loss

In the evolution of the housing problem as industrial concerns are striving to solve it, a tendency has developed of deliberately accepting an initial financial sacrifice, in the belief on the part of the employing company that to do so constitutes a sound and profitable investment. To illustrate the point, a large firm located in New England is building 100 single houses, of five rooms each, well constructed, with modern conveniences, costing close to \$4,500, which it proposes to rent to employees for \$20 a month. Any worker who wishes to own one of the cottages as a permanent home will be permitted to buy on an easy payment plan, but such houses as are not disposed of by sale will be rented at a price which will yield only about 5 per cent gross on the cost to the company. This means an actual loss. And rentals in the same neighborhood and in fact throughout the city where the factory is located average much higher, usually for inferior dwelling places.

The idea is that to furnish good and at the same time cheap homes to employees will act not only to make up the deficit in rentals, but to reap a handsome profit on the investment by keeping down factory costs. This influence must show itself in various forms, it is believed, but chief among them in an economy which comes with minimizing the labor turnover. In fact, hardly any one element in

manufacturing industry is more important than this. A rapid turnover, with all the time old workers going and new workers coming, sends costs upward. When business is at its best, labor is the most restless. Men drift from one job to another, because work is always waiting for them; they seek higher pay and perhaps hope to better themselves in the nature of their work. Other things being equal, a low rental for a satisfactory home is tantamount to maintaining a relatively high wage scale.

In short, a good home in a good neighborhood is one of the greatest of all inducements to permanent employment with the better class of labor. It is actually better than a higher wage in another shop. Most men do not like to break up their homes, when they and their families are comfortably situated. When a workman undertakes to buy a house from his employers or rents from them a desirable home, he usually makes up his mind to stick to the firm. Such is the theory upon which the new practice of rental-below-cost is based.

The firm foundation which is given to the National Research Council, through the donation to it and the National Academy of Sciences of \$5,000,000, by the Carnegie Foundation, as announced elsewhere in this issue, is a warrant that there will be a continuance of the persistent effort to foster scientific discovery that marked the war work of these organizations. The war afforded a convincing demonstration of the dependence of modern nations upon scientific achievement, and the United States must not fall behind in its competition with the other great peoples of the world. The gift is a fitting supplement to Mr. Carnegie's contributions to science and industry.

Meeting of National Efficiency Society

The eighth annual meeting of the National Efficiency Society will be held at the Aldine Club, 200 Fifth Avenue, New York, at 5 p. m., Jan. 30, for election of officers, changes in bylaws, consideration of program for the year, etc. At 7 o'clock there will be an informal dinner with prominent speakers representing capital, labor and the public, who will discuss the bearing which the plan for industrial tribunals proposed by the President's industrial conference now meeting in Washington will have on industrial councils (shop committees) and representatives of the employers and employees of the arsenal orders department of the Government and from industrial plants will tell of their experiences with shop committees. H. F. J. Porter is executive secretary at 200 Fifth Avenue, New York.

American Electrochemical Society's Spring Meeting

Plans are rapidly taking shape for two joint sessions between the American Electrochemical Society and the American Institute of Electrical Engineers at Boston, April 8, 9 and 10. "Electrically Produced Alloys" and "Power for Electrochemical Purposes" will be discussed. A joint excursion to the Lynn laboratories of the General Electric Co. and a joint smoker the evening before are also being arranged. The sessions of the Electrochemical society by itself will include the business meeting, address of the retiring president, a symposium on "Colloids" and a number of other papers.

The Mine Safety Appliance Co. has recently bought a site on Thomas Boulevard, Pittsburgh, on which it proposes to erect a chemical laboratory at a cost of about \$85,000. A warehouse will also be erected.

CORRESPONDENCE

Compulsory Metric System Bill

To the Editor: If the bill introduced by Senator Shaffroth which provides for compulsory adoption of the metric system of weights and measures in the United States, is enacted, industry in this country will suffer losses of billions of dollars and will be thrown into a state of chaos that would result in practical paralysis.

The propaganda which has been directed by proponents of the metric system, while insidious and fallacious, has been widespread and successful insofar as it has induced various chambers of commerce and semi-trade bodies to pass resolutions favoring the adoption of the system, and to forward them to Congress. These organizations do not, however, represent the manufacturer who is the one actively concerned in the issue. In fact, it is doubtful whether manufacturers as a whole fully realize that this danger has reached such a menacing status.

Transition from our present standards to those of the metric system would mean the introduction of a dual standard as has been the case in other countries where the change has been made. Results would be exactly the opposite of those claimed by its advocates—complexity instead of simplicity, confusion instead of order, and diversity instead of uniformity. Not only would there be confusion and loss through the necessity of converting from one standard to the other in commercial transactions, but it would require complete new equipment in many forms of measuring equipment, tools, gages and innumerable articles of manufacture, not to speak of changes in designs, plans, etc.

If the metric system had possessed any merit, it would have been put into use in this country long ago, not by force of law but by that of expedience. The very fact that the people of the United States have declined to avail themselves of its principles and to abandon the system to which they are accustomed, should justify the denial of the passage of a law to enforce its adoption:

A. E. FULTON,
Vice-President, International Motor Co.

Free Port Zones

To the Editor: There has been under discussion for a long time by the United States Government some sort of free port policy, and at the present time several bills are pending in the House of Representatives and much investigating has been done by a commission appointed for this purpose. Some opposition has been created in the past on account of the wording of this theory, namely, in coupling the words "free port" with the words "free trade." Inasmuch as under the conditions of all the bills which have been proposed there is no infringement upon the theory of protection, therefore in all present bills under consideration the term "free port" has been omitted and the words "foreign trade zone" in ports of entry of the United States have been substituted. Recent developments tend to show that public opinion is rapidly accepting this principle, and it is fair to presume that some bill will soon be adopted by Congress so that the foreign trade zone may become a reality here.

Jan. 16. B. F. CRESSON, JR.,
50 Church Street, New York.

Plate Mill for Jones & Laughlin Steel Co.

The Mackintosh-Hemphill Co., Pittsburgh, has received a contract for the building of a two-high universal plate mill for the Jones & Laughlin Steel Co., to be installed in its Soho works at Pittsburgh. This mill will replace a present 108-in. two-high reversing plate mill, which is to be torn out, and will have a capacity of rolling universal skelp up to about 45-in. wide, and when the vertical rolls are removed it will roll sheared plates up to 78-in. wide. The mill is expected to be

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ready for operation about July 1, and the tables for this mill will be furnished by the Mesta Machine Co., Pittsburgh. The Mackintosh-Hemphill Co. also has a contract for a large universal plate mill for Canada.

Sheet Bar Plant at Mansfield

The Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, is planning to build a steel plant to manufacture sheet bars for the requirements of its own sheet mills. This will consist of four 60-ton open-hearth furnaces, eight soaking pits, a 32-in. 3-high blooming mill and a 24-in. sheet bar mill with a bull-head finishing stand. The plant will have an annual capacity of about 125,000 tons, and it will be laid out with a view of adding six open-hearth furnaces when required.

In order to provide for the extensions the board of directors has voted an increase in the capital stock from 10,000 shares of common stock with a par value of \$50 to 50,000 shares of no par value common stock to be exchanged on the basis of five to one, and an increase of the preferred stock from \$500,000 to \$3,000,000. The present 7 per cent preferred stock will be redeemed and the new preferred stock will be an 8 per cent cumulative issue. Of the new stock, \$500,000 will be used for redeeming the old stock and \$1,500,000 will be offered to public subscriptions, the remainder not being sold at present. A meeting of the stockholders has been called for Jan. 29 to approve the action of the directors. It is the intention to place contracts for the plant as soon as possible.

The company is now installing four new sheet mills, which when completed will increase its capacity of finished sheet steel to 80,000 tons per year. Its product includes black, blue annealed, galvanized and electrical sheets.

Iron and Steel Markets

PIG IRON LEADING MARKET

Sales Into Second Half at Higher Prices

Rails Mills Commandeered—Pipe Up \$7 per Ton—European Conditions

Pig iron prices having advanced to \$40, Valley, for basic; \$41 for Bessemer and \$40, Birmingham, for No. 2 foundry, with correspondingly high prices in the East, furnaces were willing to sell and buyers did not hesitate to contract for large tonnages even over the second half. Cleveland made heavy sales of basic and in all centers foundry grades sold in quantity. Heavy selling of Lake Superior charcoal iron was followed by an advance of \$5 per ton, with sales limited to 1000 tons to a customer.

Owing to advances in prices of ore and coke and higher freight rates, it is expected that cost of making pig iron will be considerably higher at a not far distant date. It is not improbable that Spanish ore can be imported in competition with Lake Superior and Eastern ores. Under existing ratio contracts present pig iron prices put coke at \$7.50 to \$8, and the trade expects a further spread over the regulated price of \$6 when the peace ratification makes the Lever law inoperative.

What may be mildly termed a surprise was an eleventh-hour determination on the part of the Railroad Administration to secure maximum delivery of rails in the coming month. Falling back on the technicality that we are still at war, orders of the war-time type have been issued on all rail mills for a total tonnage calculated to keep the mills busy for several months. Included are mills which have stood out for the \$57 per ton basis and have not sold at the \$47 level obtaining meanwhile. Efforts are now being made to secure a modification of the orders, which it is generally impossible to fulfill in the one month of life presumably remaining for Government control. As the war-time stipulations provided that manufacturers were entitled to cost plus a reasonable profit, there is no great concern.

A collateral question is the matter of dislocating existing mill schedules by giving substantial priority to some of the Government orders. Manufacturers generally would welcome anything that would mean an improvement in transportation, for if better freight movements cannot be obtained, no great good can come from any attempted expansion of operations. It is held that regeneration of morale is second only to increased rolling stock and motive power.

The severe weather has aggravated the shortage in the supply of cars. A number of blast furnaces have had to be banked and the starting of others has been delayed. Coal mining operations have had to be curtailed.

The corporate railroads are still active on their own account in placing rail orders. The mill of the Illinois Steel Co. is now booked practically through the third quarter. One Eastern rail mill had to re-

fuse 20,000 tons. The Algoma mill is booked for the year for Canadian roads, having recently taken 230,000 tons. The Administration's orders just placed may total 75,000 tons. The Pennsylvania has bought 600,000 tie plates at about 3c. per lb.

The fourth quarter earnings statement of the Steel Corporation appears to sustain the leading interest's price maintenance program. Viewed in the light of the showing of the second quarter, over which, if anything, higher prices obtained, there is an indication that large appropriations for contingency purposes were set aside early in the year for the eventualities of the latter part. Were any of these funds returned to the earnings account in the last quarter, the current rate of profit may be less than is apparent.

Prices are more widely variant, with tank plates at 3.50c. to 4c., Pittsburgh, for reasonably early delivery, and structural shapes as high as 3.50c. and 3.75c. What semi-finished material is obtainable likewise commands premiums of \$5.

All the leading independent pipe mills have advanced pipe \$7 a ton, returning to the level which existed in the first 12 weeks of 1919.

Cast-iron pipe has been advanced \$3 per ton in the South and in Chicago. For South America 22,000 tons has been sold.

High grade manganese ore has sold as high as 80c. per unit against 55c. a few weeks ago and is very scarce. American ferromanganese makers are talking \$160, delivered, for last half. Spiegleisen, 20 per cent, has advanced \$10 to \$57.50, furnace.

The tale of railroad chaos, fuel shortage and insufficient production is world-wide. Deliveries in England on some forms of plates for shipyards are a year behind. The British semi-finished market is out of control and prices everywhere in Europe are soaring.

The German trade is looking forward to a plan for establishing a compensation fund from which financial help may be obtained in importing semi-finished products so that the industry may get on its feet.

A movement is also under way to fix maximum prices for the home trade. As much as 3,000 marks per ton has been obtained in Germany for steel bars from the Saar district.

Pittsburgh

PITTSBURGH, Jan. 27.

The scarcity of cars and the shortage in supply of coal are playing havoc with operations of blast furnaces, steel works and in fact all manufacturing plants using coal for fuel, and the situation this week is worse than last week, with no near relief in sight. The situation seems to be worse in the Youngstown, Ohio, district than in Pittsburgh, but it is bad enough here. Blast furnaces are running very short of both coal and coke, and unless supply of fuel soon gets better there will have to be a shutdown of a good many Pittsburgh and Valley plants. In the Pittsburgh district the Jones & Laughlin Steel Co. has three blast furnaces idle, two of which would be started at once if a supply of coal were in sight. One Eliza and the Soho furnace are all ready to operate, but one Ali-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 27, 1920	Jan. 20, 1920	Dec. 30, 1919	Jan. 28, 1919
No. 2 X, Philadelphia...	\$44.35	\$44.35	\$43.10	\$36.15
No. 2, Valley furnace...	40.00	40.00	39.00	31.00
No. 2, Southern, Cin'tit...	43.60	43.60	39.60	34.60
No. 2, Birmingham, Ala.†	40.00	40.00	36.00	31.00
No. 2, furnace, Chicago*	40.00	40.00	40.00	31.00
Basic, del'd, eastern Pa...	39.25	39.25	39.00	33.90
Basic, Valley furnace...	40.00	38.00	36.00	30.00
Bessemer, Pittsburgh...	42.40	40.40	38.40	33.60
Malleable, Chicago*	40.50	40.50	40.50	31.50
Malleable, Valley	41.00	40.00	38.00	31.50
Gray forge, Pittsburgh...	40.40	39.40	38.40	31.40
L. S. charcoal, Chicago...	52.50	47.50	45.00	38.85

Rails, Billets, Etc., Per Gross Ton:	Jan. 27, 1920	Jan. 20, 1920	Dec. 30, 1919	Jan. 28, 1919
Bess. rails, heavy, at mill	\$45.00	\$45.00	\$45.00	\$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh...	48.00	48.00	48.00	43.50
O.-h. billets, Pittsburgh...	48.00	48.00	48.00	43.50
O.-h. sheet bars, P'gh...	50.00	50.00	50.00	47.00
Forging billets, base, P'gh.	64.00	64.00	60.00	56.00
O.-h. billets, Phila...	59.10	59.10	59.00	47.50
Wire rods, Pittsburgh...	60.00	60.00	60.00	57.00

Finished Iron and Steel,	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	3.75	3.75	3.745	3.745	
Iron bars, Pittsburgh...	3.50	3.50	3.50	3.50	
Iron bars, Chicago...	3.00	3.00	2.90	2.97	
Steel bars, Pittsburgh...	2.75	2.75	2.75	2.70	
Steel bars, New York...	3.27	3.27	3.27	2.97	
Tank plates, Pittsburgh...	3.00	2.65	2.65	3.00	
Tank plates, New York...	3.02	3.02	3.02	3.27	
Beams, etc., Pittsburgh...	2.55	2.45	2.45	2.80	
Beams, etc., New York...	2.82	2.82	2.82	3.07	
Skelp, grooved steel, P'gh	2.45	2.45	2.45	2.70	
Skelp, sheared steel, P'gh	2.65	2.65	2.65	3.00	
Steel hoops, Pittsburgh...	3.25	3.25	3.25	2.30	

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Jan. 27, 1920	Jan. 20, 1920	Dec. 30, 1919	Jan. 28, 1919
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	4.60	4.60	4.35	4.70
Sheets, galv., No. 28, P'gh.	5.95	5.95	5.70	6.05
Sheets, blue an'l'd, 9 & 10.	3.30	3.30	3.55	3.90
Wire nails, Pittsburgh...	4.50	4.50	4.50	3.50
Plain wire, Pittsburgh...	3.25	3.25	3.25	3.25
Barbed wire, galv., P'gh.	4.45	4.45	4.45	4.35
Tin plate, 100-lb. box, P'gh	\$7.00	\$7.00	\$7.00	\$7.35

Old Material, Per Gross Ton:	Jan. 27, 1920	Jan. 20, 1920	Dec. 30, 1919	Jan. 28, 1919
Carwheels, Chicago...	\$36.00	\$36.00	\$31.00	\$23.00
Carwheels, Philadelphia...	38.00	38.00	30.00	23.00
Heavy steel scrap, P'gh.	27.50	27.00	25.00	16.00
Heavy steel scrap, Phila.	26.00	25.00	22.50	16.00
Heavy steel scrap, Ch'go.	24.00	24.00	23.50	15.50
No. 1 cast, P'gh...	33.00	33.00	30.00	21.00
No. 1 cast, Phila...	38.00	38.00	33.00	23.50
No. 1 cast, Ch'go (net ton)	39.50	36.50	33.50	20.50
No. 1 RR. wrot, Phila...	35.00	34.00	31.00	23.00
No. 1 RR. wrot, Ch'go (net)	26.00	25.50	24.00	15.75

Coke, Connellsville,	Per Net Ton at Oven:	Jan. 27, 1920	Jan. 20, 1920	Dec. 30, 1919	Jan. 28, 1919
Furnace coke, prompt...	\$6.00	\$6.00	\$6.00	\$5.00	
Furnace coke, future...	6.00	6.00	6.00	6.00	
Foundry coke, prompt...	7.00	7.00	7.00	5.00	
Foundry coke, future...	7.00	7.00	7.00	7.00	

Metals,	Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	19.50	19.50	19.50	20.00	
Electrolytic copper, N. Y.	19.25	19.25	19.25	20.00	
Spelter, St. Louis...	9.30	9.30	9.00	6.75	
Spelter, New York...	9.45	9.65	9.35	7.10	
Lead, St. Louis...	8.45	8.50	7.50	5.00	
Lead, New York...	8.75	8.75	7.75	5.30	
Tin, New York...	62.25	64.00	59.25	71.50	
Antimony (Asiatic), N. Y.	11.25	10.75	9.63½	7.50	

quippa stack is being relined. There is a shortage not only in cars but also in motive power, and the railroads seem helpless to relieve the situation. Actual coal famines are reported in a number of places, and some public institutions, such as schools, have had to close for lack of fuel. The transportation situation is much worse now than at any time during the war, and the recent cold weather greatly increased the demand for coal, which cannot be met. Railroads are using old locomotives that should have been in the scrap pile months ago, and the cold weather greatly reduces their power and efficiency. The coal companies say they have plenty of miners to mine the coal but cannot get cars to ship it, and the result is they are operating their mines only two or three days a week. Last week the car supply for coal mines in the Pittsburgh district was not over 35 to 50 per cent, and on two or three days was down to 30 per cent. Cars have been sent all over the country irrespective of the lines that own them, and they are not returned so that they could be used in the districts they were intended to serve. The condition comes at a time when every ton of steel is needed that can be possibly turned out. Many steel works and finishing mills have large stocks of finished products piled in their warehouses and shipping yards, which they are unable to move, and they have been compelled to ease down in operations. It is said no real relief can be expected before April, and if there should be further cold weather and heavy snows the situation is bound to get worse.

The demand for pig iron, semi-finished steel and finished steel products shows no abatement, but is really getting stronger. There is a scarcity of steel all over the country in every form, and jobbers and consumers are begging the mills for material, which they cannot furnish, largely because of shortage in cars, and also because output is being cut down, owing to the coal shortage and the inefficiency of labor. Prices

continue to go up, and in the last few days basic iron has advanced squarely \$2 a ton, and some other grades fully \$1 per ton. These advances in iron are bound to be reflected very soon in higher prices for finished material.

Pig Iron.—Prices on pig iron have started to soar again and seem likely to go still higher. Last week we referred to a reported sale of 1500 tons of basic iron at \$40 Valley furnace for prompt delivery, and this sale is now verified. The purchaser of this iron was the Central Steel Co. of Massillon, Ohio, the seller being the Struthers Furnace Co., Cleveland, whose blast furnace is at Struthers, Ohio. Later the Struthers Furnace Co. sold 45,000 tons of basic iron for second quarter delivery at \$40 Valley furnace, and M. A. Hanna & Co., Cleveland, have sold to the Central Steel Co. 18,000 tons of basic iron for second half delivery at \$40, Valley furnace. These authentic sales put the basic iron market squarely at \$40, Valley furnace. Late last week a local interest bought 10,000 tons of basic iron at \$38 Valley furnace, and will apply this iron on contracts for basic made with regular consumers. Bessemer iron has also advanced to \$41 at Valley furnace, a sale of 1000 tons and another of 1500 tons having been closed at that price. There have been further sales of foundry iron in fairly large lots at \$40 to \$41, with some sellers quoting \$42 at furnace. We now quote as follows, Valley furnace, the freight rate for delivery to the Pittsburgh or Cleveland districts being \$1.40 per gross ton.

Basic	\$40.50
Bessemer	41.00
Gray forge	39.00
No. 2 foundry	\$40.00 to 41.00
No. 3 foundry	39.50 to 40.50
Malleable, Valley	41.00 to 42.00

Ferrolloys.—Consumers of ferromanganese are anxious to cover their needs for last half of this year, and the demand for that delivery is active. Several

producers are quoting 76 to 80 per cent domestic ferromanganese at \$150 delivered, and several sales are reported at that price.

We quote 76 to 80 per cent domestic ferromanganese \$150 to \$155 for second half delivered, with a reduction of \$1.50 to \$1.75 per unit for lower percentages. We quote 50 per cent ferrosilicon at \$80 to \$85, and 18 to 22 per cent spiegeleisen at \$43 to \$45, delivered. Prices on Bessemer ferrosilicon are: 9 per cent, \$56.50; 10 per cent, \$59.50; 11 per cent, \$62.50; 12 per cent, \$66.10. We quote 6 per cent silvery iron, \$45.75 to \$46.25; 7 per cent, \$50 to \$50.50; 8 per cent, \$52 to \$52.50; 9 per cent, \$54 to \$54.50, and 10 per cent, \$56.50 to \$57. An advance of \$3.30 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on Bessemer ferrosilicon, and an advance of \$2.50 per gross ton is charged for each 1 per cent silicon for 11 per cent and over on silvery iron. All the above prices are f.o.b. maker's furnace, Jackson or New Straitsville, Ohio, which have a uniform freight rate of \$2.90 per gross ton for delivery in the Pittsburgh district.

Semi-Finished Steel.—The acute shortage in supply of sheet bars is greatly hampering operations of sheet and tin plate mills, all of which are short of steel, and are not turning out anything like normal output. The American Sheet & Tin Plate Co. is still bringing sheet bars from the West to the Pittsburgh district, its regular source of supply not furnishing enough bars to keep its mills going. Sales of sheet bars have been made at \$55 or higher, at maker's mill, to consumers of sheets, who are having these bars converted into sheets at so much per ton. The steel mills are running at 90 to 95 per cent of ingot capacity in some districts, but in Youngstown the coal shortage is seriously cutting down operations of steel mills, and several large plants may close this week for lack of coal. Prices quoted are largely nominal, as it is almost impossible to buy billets or sheet bars in the open market at any price.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at \$48 to \$50; 2 x 2-in. billets at \$48 to \$50; slabs, \$50 to \$52; sheet bars, \$52 to \$55, and forging billets, \$66 to \$68 base, all f.o.b. at mill Pittsburgh or Youngstown.

Structural Material.—A leading local interest is now quoting plain material at 2.70c., but is selling only in a limited way and to regular customers. The Carnegie Steel Co. price is still 2.45c., but for indefinite delivery. The American Bridge Co. has taken 500 tons for a new building for the Armstrong Cork Co. at Lancaster, Pa., and the Jones & Laughlin Steel Co. 600 tons for a building for the B. F. Goodrich Tire Company, Akron, Ohio. Inquiry is reported very active, and fabricators are figuring on a very large amount of new work. We now quote plain material up to fifteen inches at 2.45c. to 2.70c., Pittsburgh.

Plates.—The demand for plates from all sources is abnormally heavy, the two leading local makers being filled up for months ahead, while the smaller plate mills are also well filled, and are quoting 3.50c. minimum up to 4c. The Carnegie Steel Co. is said to be filled on plates over the remainder of this year. The demand from shipbuilding interests is very active, and recently several buyers from the Pacific Coast have been scouring this market trying to find plates for delivery in the next four to six months. The price of the Carnegie Steel Co. on sheared plates of tank quality is 2.65c., but smaller makers quote 3.50c. up to 4c.

Sheared tank plates, ¼-in. and heavier, at 2.65c. to 3.50c., Pittsburgh, depending on order and delivery and the latter would have to be paid for delivery in three to four months.

Sheets.—There is no change in conditions in the sheet trade. There is a great scarcity in supply, the American Sheet & Tin Plate Co. having practically no sheets to sell to manufacturing consumers for first half delivery, while other mills are fast getting into the same condition. The demand shows no falling off, but, if anything, is getting heavier. Premiums in prices ranging anywhere from \$5 up to \$20 or more, are still being offered for sheets for fairly prompt delivery.

We now quote No. 28 gage, box annealed, one-pass black sheets at 4.35c. to 4.60c.; No. 28 galvanized, 5.75c. to 5.95c., and No. 10 blue annealed at 3.55c. to 3.80c., the lower prices named being the March 21 schedules.

Tin Plate.—Fairly heavy export sales of tin plate have been made at \$9 per base box, mostly for the Orient. The domestic trade is well covered for first half, but output is being cut down on account of the

coal shortage, and shipments are held up because of the scarcity in cars. Some mills report they are running nearly 100 per cent, but output is not over 85 per cent of normal, due largely to inefficiency of labor. We quote tin plate for domestic consumers for first half delivery at \$7 per base box, and for export at \$8.50 to \$9 per base box, Pittsburgh.

Wire Rods.—Makers report that when they have any rods to spare they have no trouble in getting as high as \$65 for soft open-hearth or Bessemer rods, while high-carbon rods bring anywhere from \$75 to \$100 at mill, prices depending on the carbon content.

Wire Products.—It is understood the Youngstown Sheet & Tube Co. has a new wire nail card under way, in which the price of wire nails is \$3.75 base, an advance of 50c. over the present card. The extras in this new card will be materially changed, the object being to correct inequalities in extras on wire nails that it is claimed exist in the present card. The demand for wire nails and plain wire for manufacturing purposes is still very heavy, much larger than the mills can supply. The American Steel & Wire Co. is still quoting \$3.25, base, on wire nails, but in some sections is insisting that jobbers, whom they supply, shall sell to their trade at an advance of not over 50c. per keg. This works a great hardship on jobbers in certain sections, who are paying \$4.25, Pittsburgh, their nails costing them delivered a higher price than the one set by the American Steel & Wire Co. at the limit at which jobbers shall sell. We continue to quote wire nails at \$3.25 to \$4.25 base, and plain wire for manufacturing purposes at 3c. to 3.50c., the lower prices named being those of the leading interests.

Iron and Steel Bars.—The two leading local makers of steel bars are reported fully sold up on all they can turn out over the remainder of this year, and have a good deal of tonnage sold for delivery in first quarter of 1921.

We quote steel bars rolled from billets at 2.35c. to 3c. and from old steel rails, 3c. Pittsburgh mills rolling iron bars quote, at 3.25c. to 3.50c., Pittsburgh, plus full freight rate to point of delivery.

Hot-Rolled Strip Steel.—Most consumers are covered over first quarter and some for second quarter, prices for the latter delivery to be those in effect at the time shipments were made. We continue to quote hot-rolled strip steel at 3.50c. to 3.75c., f.o.b. mill Pittsburgh, but sales have been made at 4c. and higher.

Cold-Rolled Strip Steel.—Makers are sold up for first quarter, but shipments are delayed on account of the scarcity of cars, while output is also reduced because of the coal shortage and the labor situation. We quote cold-rolled strip steel at 6c. per lb. at mill in large lots, but sales of small lots have been made at 6.50c. and higher.

Cold-Rolled Steel Bars.—The demand continues active and makers are sold up for first quarter, and have a good deal of business on their books for second quarter delivery. We quote cold-rolled steel bars at 3.60c. in large lots up to 4c. per lb., f.o.b. Pittsburgh.

Spikes.—Two Western roads have lately placed 25,000 to 30,000 kegs of standard spikes, a large part of this business going to local makers. The demand for railroad spikes has been active for some time, and makers are pretty well sold up for present quarter.

We quote standard spikes, 9/16 x 4½ in., at \$3.35 base per 100 lb. in carload lots of 200 kegs of 200 lb. each, and small spikes, ¾ in., 7/16 in. and smaller, at \$4.25 per 100 lb. in carload lots of 200 kegs of 200 lb. each, plus usual extras. Boat and barge spikes, \$4.25 per 100 lb. in carload lots of 200 kegs of 200 lb. each, f.o.b. Pittsburgh. For less than carload lots 1c. per lb. higher is asked.

Nuts, Bolts and Rivets.—A meeting of the Nut, Bolt and Rivet Institute was held Wednesday, Jan. 21, in the Waldorf-Astoria Hotel, New York, at which officers were elected, these being given on another page in this issue, and other business was transacted. Reports made by all the makers showed that demand for nuts, bolts and rivets is very active, all the makers being sold up over first quarter, and some have taken contracts for second quarter delivery, prices for delivery for second

quarter to be those in effect when delivery is made. No action was taken on prices. Makers of rivets reported they are well sold up for first quarter, and present prices are firm on the basis of \$4.15 for large structural and ship rivets, and \$4.25 per 100-lb. base, for large boiler rivets. It is said practically all makers of rivets are now quoting these prices. Discounts being quoted by nearly all the leading makers of nuts and bolts are given on page 377.

Iron and Steel Pipe.—Never in the history of the tubular trade, has the consuming demand for pipe and oil well tubular goods been as heavy as for many months past, and it promises to continue just as heavy for a long time. Mills are being offered large and desirable orders every day on which they refuse to quote, being filled up so far ahead that it is impossible for them to take on any more new business for delivery inside of four to six months. All the leading independent mills have lowered discounts on steel pipe $3\frac{1}{2}$ points, equal to an advance of \$7 per ton, and are now quoting these higher prices, but the National Tube Co. and one small independent mill continue to quote discounts on the March 21 basis. Present prices on pipe now quoted by the independent mills are those in effect from Jan. 1 to March 21, last year. It will be recalled that discounts were increased 3 points on Jan. 1, 1919, and on March 21, $3\frac{1}{2}$ points, so that prices are again back to those in effect prior to the March 21 reduction.

Old Material.—The local scrap market is not nearly so active in demand as at other important scrap centers, such as Cleveland, Chicago, Youngstown, Buffalo and other places. Prices are very firm, and heavy steel scrap, borings and turnings are up fully \$1 per ton over last week's prices. A leading consumer of turnings in this district that has not bought for some time, is again a fairly heavy buyer, and this has resulted in a sharp advance in price of turnings. The Westinghouse Electric & Mfg. Co. sold last week its February scrap, and is said to have obtained better than \$27 at its works, East Pittsburgh, for its heavy steel scrap. A sale of 3000 tons of selected heavy steel scrap is reported at \$27.50, and 1500 tons of low phos. melting stock, bloom, billet and plate ends, at \$32.50, both for delivery at consumers' mills in the Pittsburgh district. We quote for delivery to consumers' mills in the Pittsburgh and other districts that take Pittsburgh freight rates, as follows:

Heavy steel, melting, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh, delivered.	\$27.50 to \$28.00
No. 1 cast for steel plants.	33.00 to 34.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Franklin, Pa., and Pittsburgh.	34.00 to 35.00
Compressed steel.	24.00 to 25.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh district.	19.00 to 20.00
Bundled steel stamping.	18.00 to 19.00
No. 1 busheling.	24.00 to 25.00
Railroad grate bars.	24.00 to 25.00
Low phosphorus melting stock (bloom and billet ends, heavy plates) $\frac{1}{4}$ in. and heavier.	32.00 to 33.00
Railroad malleable.	26.00 to 27.00
Iron car axles.	34.00 to 35.00
Locomotive axles, steel.	33.00 to 34.00
Steel car axles.	31.00 to 32.00
Cast iron wheels.	33.00 to 34.00
Rolled steel wheels.	27.00 to 28.00
Machine-shop turnings.	18.00 to 18.50
Sheet bar crop ends (at origin).	30.00 to 30.50
Heavy steel axle turnings.	20.00 to 21.00
Heavy breakable cast.	25.00 to 26.00
Cast iron borings.	20.50 to 21.00
No. 1 railroad wrought.	28.00 to 29.00

Coke.—Nearly all producers of coke report the supply of cars worse, if anything, and the chances for betterment in the near future are not bright. Practically none of the coke producers is selling any furnace or foundry coke for spot shipment, but all are applying their entire output of coke on contracts. With basic iron close to, or all of, \$40 at Valley furnace, contracts for coke made sometime ago on a 5 to 1 basis, will net the sellers of coke about \$8 per ton at oven. Other contracts on a $5\frac{1}{2}$ to 1 basis will net coke producers nearly \$7.50.

Chicago

CHICAGO, Jan. 27.

Eleventh hour orders by the Railroad Administration have forced a revision of rolling schedules on rail contracts recently placed by the railway corporations. Of these belated purchases 33,000 tons were bought from the local mill for delivery before March 1. At the same time additional contracts have been signed by the railroad companies definitely closing orders for nearly 40,000 tons from the Illinois Steel Co. The tonnage now contracted for or reserved with this mill is expected to tax its capacity until the end of the third quarter.

Contracts received from Canadian railroad lines by the Algoma mill, aggregating approximately 230,000 tons, will employ that company's rolling capacity throughout the year. Additional railroad locomotive inquiries have appeared and a St. Louis line has closed an order for 40 engines with the Lima shop. Although two inquiries for 1000 and 2000 freight cars respectively have been put out, in addition to that for 4000 refrigerator cars recently issued by the Union Pacific, the activity of the carriers in this direction has been largely confined to feeling the market.

The demand for pig iron, scrap and finished steel products continues urgent, with prices still tending upward. Cast iron pipe has advanced \$3 a ton. Finished steel in all forms is scarce and the car shortage which is delaying deliveries of fuel is making it difficult for producers to catch up on their commitments. The leading interest, in fact, has been forced to bank one furnace each at Gary and South Chicago.

The influenza epidemic is also felt, although it has not yet affected operation materially. A feature of the pig iron market was the sale of 1500 tons of Northern foundry to a Wisconsin melter at \$40 base Birmingham.

Cast scrap is also commanding high prices, some recent sales of No. 1 cast having been closed at \$40 per net ton, or \$44.80 per gross ton.

Plates.—Although bookings in plates are heavier than in shapes, the leading interest is still in a position to take a limited tonnage on first quarter specification for delivery in the following quarter. Inquiries for second half delivery have been received but have not been entertained. The railroad corporations, now looking to their needs preparatory to the return of their property, promise to become an important factor in the market. The Missouri, Kansas & Texas, reported as inquiring for motive power last week, has ordered 40 engines from the Lima Locomotive Corporation. The St. Louis Southwestern is in the market for 10 Mikado type locomotives. The Grand Trunk wants 10 switchers of the eight-wheel type, and the Delaware, Lackawanna & Western is inquiring for six Pacific type engines. The Illinois Central, Rock Island and Burlington are contemplating purchases of power, but have not issued formal inquiries. The railroads are also feeling the market on freight cars, but have sent out few definite requests for figures, the exception being two inquiries from Western lines for 2000 ore cars and 1000 Gondola cars respectively. In passenger equipment, two notable current inquiries are those of the Missouri, Kansas & Texas and the Missouri Pacific, the former calling for 58 and the latter for 30 cars.

The mill quotation is 2.65c. to 2.90c. Pittsburgh, the freight to Chicago being 27c. per 100 lb. Jobbers quote 3.67c. for plates out of stock.

Pig Iron.—Inquiries for last half delivery are on the increase, and sales for prompt shipment and first half shipment continue numerous, although involving smaller tonnages, indicating that some consumers underestimated their needs and are now buying to fill in. A feature of the market was the sale of 1500 tons of Northern foundry to a Wisconsin melter for first half shipment at \$40 base, Birmingham. The delivered price, it will be noted, was considerably higher than the ruling quotation, as observed by the leading producer. The sale of Northern iron on a Birmingham base is not entirely new, however, as the Soo product has been sold under such arrangements on a number of

occasions and only recently has been disposed of for early delivery to the extent of several thousand tons at \$38 and \$39 base, Birmingham. Most of the Southern merchant producers are now in the market for first half delivery, and a Kentucky stack has opened its books for second half at \$40 base, furnace. Already over 8000 tons of foundry has been sold on this basis, subject to the furnace's confirmation. Malleable foundries are beginning to inquire for their last half requirements rather freely, and within the past few days have purchased about 5000 tons of standard Bessemer, paying a premium of 75c. over the price of malleable. Charcoal iron has advanced to \$50, furnace, and some sales for second half delivery have been closed at that price.

The Wisconsin producer of copper free, low phosphorus, it develops, will not blow in its stack until about March 1. Prominent among current inquiries is one from a Wisconsin melter for 1000 tons of basic for prompt delivery and 1000 tons of foundry for first half.

The following quotations are for iron delivered at consumer's yards except those for Northern foundry, malleable and steel-making irons, including low phosphorus, which are f.o.b. furnace and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, average sil. 1.50 (other grades subject to usual differentials), delivered at Chicago.....	\$52.50
Northern coke No. 1, sil. 2.25 to 2.75.....	42.25
Northern coke foundry, No. 2, sil. 1.75 to 2.25.....	40.00
Northern high phos. foundry.....	40.00
Southern coke, No. 1 foundry and No. 1 soft, sil. 2.75 to 3.25.....	48.20
Southern coke, No. 2 foundry, sil. 2.25 to 2.75.....	46.60
Southern foundry, sil. 1.75 to 2.25.....	45.00
Malleable, not over 2.25 sil.....	40.50
Basic.....	39.00
Low phos. (copper free).....	46.50
Silvery, 7 per cent.....	\$51.65 to 54.30

Ferroalloys.—Ferromanganese is firm at \$150, delivered, and still higher prices are predicted. Spiegeleisen is now established at \$50, furnace. The Miami stack, South Chicago, is now on ferromanganese, but is employed on old contracts.

We quote 80 per cent ferromanganese at \$150 delivered; 50 per cent ferrosilicon at \$85 delivered; spiegeleisen, 18 to 22 per cent, \$50 furnace.

Structural Material.—Fabricating awards and inquiries are less numerous, but whether this slackening in activity is merely temporary or forecasts less construction work in this territory cannot be ascertained at this time. The Chicago, Burlington & Quincy has let 934 tons for miscellaneous bridge work to the American Bridge Co. The Duffin Iron Co. is low bidder on 440 tons for a public school building, Augusta and Larabee Streets, Chicago. Other recent awards include.

Werra Aluminum Foundry Co. plant, Mishawaka, Ind., 250 tons, to Elkhart Bridge & Iron Co.
Peerless Foundry Co., foundry syndicate, Cincinnati, 100 tons, to Pittsburgh-Des Moines Steel Co.
Oliver Iron Mining Co., stands and trestle, Stambaugh, Mich., 163 tons, to American Bridge Co.

Current inquiries include:

Rialto Theater, Louisville, Ky., 300 tons.
Monaghan Machine Co., plant addition, Chicago, 300 tons.
Plans not yet completed.

The mill quotation is 2.45c. Pittsburgh, which takes a freight rate of 27c. per 100 lb. for Chicago delivery. Jobbers quote 3.47c. for materials out of warehouse.

Bars.—Consumers are having limited success in their efforts to place their requirements in soft steel bars. Warehouses as well as mills have practically nothing to offer. Bar iron makers are reaching the point where they are limiting their sales to preferred customers, some recent transactions were on the basis of 3½c Chicago mill. Although some orders for rail-carbon steel bars continue to be booked at 3¼c mill, the majority of recent orders are concluded on the basis of prices ruling at time of shipment.

Mill prices are: Mild steel bars, 2.35c. to 3.25c. Pittsburgh, taking a freight of 27c. per 100 lb.; common bar iron, 3.25c. to 3.50c.; Chicago; rail carbon, 3.25c., mill. Jobbers quote 3.37c. for steel bars out of warehouse.

Sheets.—It can be said with little exaggeration that sheets are not to be had. Jobbers' prices have advanced \$10.

Mill quotations are: 4.60c. for No. 28 black; 3.80c. for No. 10 blue annealed, and 5.95c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight of 27c. per 100 lb. to Chicago. Jobbers quote Chicago delivery out of stock: No. 10 blue annealed, 5.32c.; No. 28 black, 6.50c.; No. 28 galvanized, 8c.

Wire Products.—A gradual improvement in operation, although somewhat impeded of late by a shortage of cars, has enabled the leading interest to increase its bookings. So far, however, its commitments have been confined to regular customers. Jobbers' stocks are low, particularly in nails, but the situation is expected to improve as mill production increases. For mill prices, see finished iron and steel, Pittsburgh, page 377.

Rails and Track Supplies.—Eleventh hours orders for rails by the Railroad Administration have forced a general readjustment of rolling schedules on contracts recently closed by the railroad corporations. From the Illinois Steel Co. the Railroad Administration has ordered 33,000 tons to be rolled before March 1. In the meantime, additional contracts have been signed by the railroad companies, among them being the Missouri, Kansas & Texas, the Wabash and the Missouri Pacific, which have definitely placed orders with the local mill for 20,000 tons, 15,000 tons and 3000 tons respectively. A rail reservation not previously mentioned is one for 3000 tons for the Elgin, Joliet & Eastern. The present commitments of the Illinois Steel Co. are expected to tax its capacity until the end of the third quarter. The Soo mill has also booked a heavy tonnage which will employ its rolling capacity throughout the year. Its rail contracts, which are entirely with Canadian roads, include 140,000 tons for the Canadian Pacific, 50,000 tons for the Canadian National Railways, 35,000 tons for the Grand Trunk and 2167 for the Temiskaming and Northern Ontario.

Standard railroad spikes, 3.35c. to 3.60c. Pittsburgh. Track bolts with square nuts, 4.90c. to 5c., Pittsburgh. Steel tie plates and iron angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 3.25c., f.o.b. makers' mills. Light rails, 2.45c. f.o.b. makers' mills, with usual extras.

Cast-Iron Pipe.—The uninterrupted rise in pig iron has again been reflected in an advance in cast iron pipe, this time \$3. Inquiries are numerous and include the following:

Akron, Ohio, 2630 tons, bids in Feb. 6.
Pontiac, Mich., 2100 tons, bids in Jan. 28.
Great Falls, Mont., 1560 tons, bids in Feb. 3.
Ft. Wayne, Ind., 620 tons, bids in Feb. 2.
Lockport, Ill., 220 tons, bids in Feb. 5.
Fort Dodge, Iowa, 155 tons, bids in Jan. 27.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., \$72.80; 6-in. and above, \$69.80; class A and gas pipe, \$2 extra.

Old Material.—Heavy melting steel and other open-hearth grades have weakened somewhat, but sales by local dealers in Cleveland and other points farther east have tended to offset the absence of local demand. Rolling mill grades are holding their own and in some instances have advanced while cast scrap continues to command more. Recent sales of No. 1 cast have been made at as high as \$40 per net ton, or \$44.80 per gross ton. The Chicago, Burlington & Quincy has offered 3000 tons, the Grand Trunk, 1200 tons and the Monon, 750 tons.

We quote delivery in consumer's yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails.....	\$30.00 to \$31.00
Relaying rails.....	40.00 to 50.00
Car wheels.....	36.00 to 37.00
Steel rails, rerolling.....	34.00 to 35.00
Steel rails, less than 3 ft.....	28.50 to 29.00
Heavy melting steel.....	24.00 to 25.00
Frogs, switches and guards, cut apart.....	24.00 to 25.00
Shoveling steel.....	24.00 to 24.50
Low phos. heavy melting steel.....	27.00 to 28.00
Per Net Ton	
Iron angles and splice bars.....	\$29.50 to \$30.50
Steel angle bars.....	24.00 to 24.50
Iron arch bars and transoms.....	29.25 to 30.25
Iron car axles.....	37.00 to 38.00
Steel car axles.....	34.50 to 35.00
No. 1 busheling.....	21.50 to 22.50
No. 2 busheling.....	15.50 to 16.00
Cut forge.....	23.00 to 23.50
Pipes and flues.....	20.00 to 20.50
No. 1 railroad wrought.....	26.00 to 27.00
No. 2 railroad wrought.....	23.50 to 24.00
Steel knuckles and couplers.....	24.50 to 25.00
Coil springs.....	26.50 to 27.00
No. 1 cast.....	39.50 to 40.00
Boiler punchings.....	26.50 to 27.00
Locomotive tires, smooth.....	26.50 to 27.00
Machine shop turnings.....	12.50 to 13.00
Cast borings.....	14.50 to 15.50
Stove plate.....	30.50 to 31.50
Grate bars.....	32.00 to 33.00
Brake shoes.....	25.50 to 26.50
Railroad malleable.....	29.00 to 30.00
Agricultural malleable.....	29.00 to 30.00
Country mixed.....	18.50 to 19.50

Cleveland

CLEVELAND, Jan. 27.

Iron Ore.—A few reservations were made during the week, but no actual sales for 1920 delivery have been made and furnaces are not showing as much anxiety as to what prices will be as they do some years. One argument that is being offered in support of a liberal advance in ore prices is that earnings have been so small recently that very little has been spent in development work in the old ranges, and there has been practically no drilling for new properties. Consequently, ore reserves have not kept pace with the production. A number of the mining companies, particularly in the Gogebic and Marquette ranges, suffered losses during the past year. There is still some demand for resale ore for use before the opening of the season of navigation and sales are being made in small lots. The amount of this ore available is said to be limited. We quote 1919 prices, lower Lake ports, as follows:

Old range Bessemer, \$6.45; old range non-Bessemer, \$5.70; Mesaba Bessemer, \$6.20; Mesaba non-Bessemer, \$5.55.

Pig Iron.—The market is very active in foundry, basic and malleable grades, the buying being mostly for the last half delivery. A northern Ohio steel plant has purchased 48,000 tons of basic iron for the last half from two Valley furnaces, 30,000 tons from one and 18,000 tons from another, at \$40, and a Valley consumer has taken 15,000 tons of basic for the same delivery. A Cleveland consumer has purchased about 5000 tons of basic from a local furnace for early shipment at \$40. Foundry and malleable iron are being booked in round lots for the last half and some of the producers are getting rapidly sold up for that delivery. One interest reports that sales this month at all of its furnaces exceed 200,000 tons and another sold 25,000 tons of foundry and malleable iron during the week. Sales include 20,000 tons of foundry grade to a Michigan automobile foundry. All foundry iron sales for the last half were at the base price of \$40 for 1.75 to 2.25 silicon. However, early shipment foundry iron has sold at \$42.50 for No. 2 in lots of 100 tons and over. Prices on malleable iron vary. One producer is quoting malleable at \$41.25, and among sales at that price is a 5000-ton lot for Pittsburgh delivery; another has sold one several thousand-ton lot at \$41 and another is quoting \$40.50 for last half. A northern Ohio consumer has taken 900 tons of malleable for the first quarter at \$42.25. The buying of foundry and malleable iron is not confined to the automobile foundries, but is well distributed among various industries. At least two of the largest buyers in the automobile field in the Michigan territory have not yet come in the market and some of the Cleveland jobbing foundries have decided to defer purchases until later. One Cleveland interest operating several furnaces does not expect to open its books for sales for several weeks. Considerable inquiry is coming out for Southern iron for the last half and consumers are willing to book orders at \$40 for No. 2, the price that is prevailing for the first half, but none of the furnaces has as yet opened its book for the last half delivery. Ohio silvery iron is active at the recent price advance. One Cleveland foundry has taken 1500 tons and another 1000 tons for the last half delivery and considerable tonnage has been placed in the Michigan territory. Other sales include about 2700 tons of Southern charcoal iron for last half. We quote, delivered Cleveland, as follows:

Basic	\$40.40
Northern No. 2 foundry, sil. 1.75 to 2.25	40.40
Southern foundry, sil. 2.25 to 2.75	\$46.25 to 46.60
Gray forge	39.40
Ohio silvery, sil. 8 per cent	54.90
Standard low phos., Valley furnace	45.00 to 46.00

Finished Iron and Steel.—Inquiry for finished steel continues very heavy and many consumers are trying to make third quarter contracts for steel bars, plates and structural material. Most mills, however, are advising their regular trade that they will not book additional orders now, but will take care of their requirements later. Several mills are distributing their

products on the basis of past requirements, so that a consumer gains no advantage in early buying. Some of the mills report a falling off in specifications, due doubtless to the recent efforts of buyers to get specifications on the mill books as soon as possible. An embargo was placed Monday on car lot shipments to Cleveland, this applying to all railroads except the Pennsylvania, which, however, is only taking shipments originating and terminating on its own lines, and this will largely shut off steel shipments into this city. The coal shortage has caused one local mill to suspend operations, but the change in the weather is expected to relieve the fuel situation, which has been acute for several days. The leading producer in this territory is now quoting plates at 3.75c., blue annealed sheets at 5c., and black sheets at 6.25c., these prices representing a \$5 per ton advance over a week ago, and buyers are paying these prices for early shipment. A large amount of building work is developing, but structural material has become so scarce that some fabricators are unable to bid on work except for extended deliveries. Hard steel bars are in heavy demand, and implement makers are trying to place agricultural shapes of hard steel, but some of the mills are so crowded with orders for bars for building work that they are unable to take care of the implement trade. Structural awards include 150 tons for the Western Drop Forge Co., Marion, Ind., and 150 tons for the Roderick Lean Mfg. Co., Mansfield, Ohio, both taken by the Fort Pitt Bridge Works. The Good-year Tire & Rubber Co. has taken bids for 2000 tons for a plant extension and other new inquiries include 2000 tons for the plant of the Eaton Axle Co., Cleveland, and 500 tons for an extension to the plant of the Massillon Rolling Mill Co. Inquiries for semi-finished steel continue very heavy, and some sheet mills are unable to get shipments on contract as fast as needed. Steel rails are selling in car lots at \$57 per ton. A new sheet mill will be built in Alliance, Ohio, according to an announcement of the Chamber of Commerce of that city. The company which will build the plant at a cost of about \$3,000,000 is now being organized.

Coke.—The scarcity of foundry coke, due principally to the car shortage, has caused some of the Cleveland and Akron foundries to suspend operations for two or three days until fuel supply was available and more foundries will be compelled to shut down this week unless the situation improves. The scarcity also applies to blast furnace coke. A Cleveland furnace has pieced out its limited supply by the purchase of 5000 tons of domestic by-product coke from an Indianapolis maker.

Wire Products.—The acute shortage of nails and wire has resulted in importations of nails in considerable quantities from Canada, particularly to supply the Detroit trade. Some Canadian nails have reached Cleveland, costing the dealer 5.25c. at mill or 5.75c. delivered. It is reported that Canadian nails are also being shipped into New England.

Bolts and Nuts.—New inquiry for bolts and nuts continues heavy and specifications on contracts are coming out in good volume. Many of the manufacturers are sold up for delivery beyond the first quarter. Some consumers are now trying to place orders for the last half.

Old Material.—The scrap market is active and most grades are higher. Youngstown and Canton mills are reported to have purchased round lots of heavy melting steel during the past 10 days. This grade has been moving freely at \$27.50 and dealers are now offering \$29 for heavy melting steel delivered consumer's yard; with \$1.50 freight rate. Some dealers say a round tonnage could not now be bought under \$30. The supply of scrap is not plentiful, as local dealers' stocks are about all sold out and producers are holding scrap for higher prices. We note the sale of 2000 tons of low phosphorus melting scrap by a Cleveland mill at \$28 for shipment to Pittsburgh, 3000 tons of borings at \$20.50 for northern Ohio delivery, 500 tons of bushing on cars at \$23.50 and turnings are reported sold as high as \$18.35. Dealers are paying \$20 already for mixed borings and turnings. Cast scrap has advanced to \$39 and

is in good demand at that price. We quote delivered consumers' yards in Cleveland and vicinity, as follows:

Heavy melting steel.....	\$27.00 to \$28.00
Steel rails, under 3 ft.....	32.00 to 33.00
Steel rails, rerolling.....	34.00 to 35.00
Iron rails.....	30.00 to 31.00
Iron car axles.....	41.00 to 42.00
Steel car axles.....	36.00 to 37.00
Low phos. melting scrap.....	30.00 to 31.00
Cast borings.....	19.50 to 20.50
Iron and steel turnings and drillings.....	16.50 to 17.50
Short turnings for blast furnaces.....	19.00 to 19.50
Compressed steel.....	24.00 to 25.00
Railroad wrought.....	29.00 to 30.00
Railroad malleable.....	33.00 to 34.00
Agricultural malleable.....	27.00 to 28.00
Steel axle turnings.....	23.50 to 24.00
Light bundled sheet scrap.....	18.50 to 19.00
No. 1 cast.....	38.00 to 39.00
No. 1 busheling.....	23.00 to 24.00
Drop forge flashings, 10 in. and under.....	23.00 to 24.00
Drop forge flashings, over 10 in.....	22.50 to 23.50
Railroad grate bars.....	30.00 to 31.00
Stove plate.....	30.00 to 31.00

Cincinnati

CINCINNATI, Jan. 27.

Pig Iron.—Buying of foundry iron for last half apparently is in full swing, as large tonnages have been disposed of during the past week and this week promises to be just as active. Southern iron is now definitely established on a \$40 basis for silicon 1.75 to 2.25 and several good sized lots were disposed of in this territory at that figure. Virginia furnaces are also taking on considerable tonnages for last half at the same figure. Southern Ohio furnaces have been very active sellers, one interest disposing of a reported aggregate of over 25,000 tons at from \$40 to \$41. A large part of this was for deliveries outside of this territory. This interest has now withdrawn from the market and it is reported that when it comes in again it will be on a \$42 basis. Inquiry is heavy and it is expected that several large sales in this territory will be completed this week. Three sales of 1200 tons of Northern foundry were reported in this neighborhood during the past week, one of 3500 and one of 6500, all for second half. Most of this business was booked at \$40, but as high as \$41 was done on several lots. All iron offering for prompt shipment is being readily absorbed and insistent demands are being received from melters to be taken care of for the rest of the year. A sale of 18,000 tons of Bessemer was completed but the purchaser's name was not disclosed. Small sales of basic are reported at from \$38 to \$40, furnace, and some malleable has been disposed of from \$41 to \$43. Ohio Silvery furnaces have also been very active sellers at the new price and one interest has now withdrawn from the market. It is reported that several silvery furnaces have been forced to bank on account of coke shortage, but this has not been confirmed. It is known that two furnaces are banked temporarily, but they are now in again.

Based on freight rates of \$3.60 from Birmingham and \$1.80 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base price).....	\$43.60
Southern coke, sil. 2.25 to 2.75 (No. 2 soft).....	42.85 to \$44.85
Ohio silvery, 8 per cent sil.....	54.30
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2).....	41.80 to 42.80
Resic, Northern.....	39.80
Malleable.....	42.80

Coke.—The coke situation is still in the same condition as last week, no improvement being noted in the car supply. It is reported here that an embargo has been placed on freight shipment other than coal and perishable goods for the New River district of West Virginia. Car shortage has not been felt so severely in Indiana and coke from Indianapolis is now being sent into the Cleveland district.

Finished Material.—Deliveries are becoming worse instead of better for all classes of finished material. Mills in this vicinity are experiencing some difficulty in keeping their plants running steadily, owing to the indifference of the workmen. It is stated that it is almost impossible to keep men working full time, two and three men being short at the beginning of every

turn, thus necessitating the doubling of crews. In view of this condition, mills consider themselves fortunate if they are able to keep running at 80 per cent of capacity. The car shortage has not as yet affected mills in this vicinity, though mills in southern Ohio are beginning to feel the pinch by reason of coal shortage. Demand for sheets continues heavy, one representative of a company operating in this territory stating that he had refused tonnages aggregating 20,000 during the past week. Included among this business was an order for 1000 tons from one of his best customers, who offered to pay big premiums for the goods. The policy adopted by the companies is to take care of those orders carried over from last year. No quotations are being made on future business, and it is not likely that books will be opened for some time, as with conditions as they are to-day in the steel industry it is increasingly difficult to get a line on operation costs. A number of mills which supply jobbers in this territory have advanced their prices during the past week. A considerable tonnage of sheets and cold rolled rounds is being disposed of by bid by the U. S. District Salvage Board, Jacksonville, Tenn.

Steel bars, 4c.; structural shapes, 4.10c.; bar iron, 4.25c.; No. 10 blue annealed, 5.48c.

Old Material.—The market for scrap continues fairly active. Consumers are purchasing only to supply their immediate needs. Prices continue strong, with an advancing tendency. One of the heaviest buyers of scrap in this territory, who has kept in close touch with the situation, feels that prices are just a little bit too high, and that dealers are liable to overreach themselves, should they bid them up further. An interesting purchase during the week was that of 458 tons of cast-iron shell blanks put up by the Ordnance Salvage Board. This material was located at Mobile, Ala., and 50 bids were received, the lot finally going to the Muncie Machinery & Supply Co., of Muncie, Ind., for \$34.55, f.o.b. Mobile. A lot of 500 tons of heavy melting steel put up by the Salvage Board brought around \$25, f.o.b. Dayton, Ohio.

Per Gross Ton	
Bundled sheet.....	\$16.00 to \$17.00
Old iron rails.....	26.00 to 27.00
Relaying rails, 50 lb. and up.....	42.00 to 43.00
Rerolling steel rails.....	28.00 to 29.00
Heavy melting steel.....	22.00 to 23.00
Steel rails for melting.....	22.00 to 23.00
Car wheels.....	26.00 to 27.00
No. 1 railroad wrought.....	23.00 to 24.00
Per Net Ton	
Cast borings.....	\$13.00 to \$13.50
Steel turnings.....	11.50 to 12.00
Railroad cast.....	29.00 to 30.00
No. 1 machinery.....	32.00 to 33.00
Burnt scrap.....	17.00 to 18.00
Iron axles.....	28.50 to 29.00
Locomotive tires (smooth inside).....	22.50 to 23.50
Pipes and flues.....	16.00 to 16.50
Malleable cast.....	22.00 to 22.50
Railroad tank and sheet.....	15.00 to 15.50

Buffalo

BUFFALO, Jan. 26.

Pig Iron.—Placement of last half iron has been eagerly sought by melters during the week and large tonnages have been taken onto order books, aggregating 75,000 to 100,000 tons of all grades, including foundry, malleable and basic, the demand for the latter grades having been considerable. Practically all the foundry iron taken by furnaces was for last half delivery, iron for early delivery being increasingly scarce and melters being desirous of protecting themselves on deliveries to the end of the year as far as possible. Tonnages booked have been at the \$40 base price, f.o.b. furnace, in most instances, with the exception of orders taken by one interest which has recently been holding for \$42 base, and has to-day advanced its prices to \$43 for 1.75 to 2.25 silicon; \$44.25 for 2.25 to 2.75 and \$46 for 2.75 to 3.25. A small quantity of prompt shipment iron was sold by this producer in the last week for \$50 for the higher silicon iron. Indications are that furnaces will hold off on booking further tonnages for last half except at sufficient advance to cover possibilities in the way of increased costs due to increased freight rates that may be put into effect, scarcity of coke, etc. The shortage of cars for loading is handi-

capping furnaces in the forwarding of shipments. Foundries are also feeling the shortage of cars in the lessened receipts of foundry coke, their supplies of which are becoming reduced with a consequent retarding and lessening of their melt. We quote as follows, f.o.b. furnace, Buffalo:

No. 1 foundry, 2.75 to 3.25 sil.	\$43.00 to \$46.00
No. 2X, 2.25 to 2.75 sil.	41.25 to 44.25
No. 2 plain, 1.75 to 2.25 sil.	40.00 to 43.00
Malleable, silicon not over 2.25.	41.25
Basic	40.00
Lake Superior charcoal, regular grades, f.o.b., Buffalo.	42.60

Finished Iron and Steel.—The very pronounced shortage of cars is adding to the difficulties and perplexities of producers and sellers, retarding the getting in of raw material and checking shipment of finished products because of the lack of box cars and the slowing down of production to some extent owing to the clogging of shipping and storage room, making the situation increasingly difficult to handle. Demand is becoming so urgent in some lines, particularly for bars and sheets for automobile manufacturers, that almost any price would be obtainable for reasonably prompt delivery.

Old Material.—Although the latter part of last week showed some recession in demand from local consumers, the market is again stiffer on account of outside demand. Some users who went out of the market, not caring to pay the higher prices asked, are now in again and some of the heaviest sales this year have been made. Heavy melting prices are up to \$26.50 to \$27, with strong local and outside demand. It is reported that at Youngstown and other districts the price is ruling at \$29, and it is not likely the current local price would secure more limited tonnages. The price for machine shop turnings and for busheling has gone up \$1, and there has been a pronounced rise in machinery cast, car wheels, malleable and stove plate. We quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel, regular grades.	\$26.50 to \$27.00
Low phos., 0.04 and under.	32.00 to 33.00
No. 1 railroad wrought.	28.00 to 29.00
No. 1 machinery cast.	37.00 to 38.00
Iron axles	40.00
Steel axles	40.00
Car wheels	37.00 to 38.00
Railroad malleable	31.00 to 32.00
Machine-shop turnings	17.50 to 18.00
Heavy axle turnings.	20.50 to 21.00
Clean cast borings.	20.00 to 21.00
Iron rail	28.00 to 29.00
Locomotive grate bars.	24.00 to 25.00
Stove plate	27.00 to 28.00
Wrought pipe	19.00 to 20.00
No. 1 busheling.	22.00 to 23.00
Bundled sheet stamping	18.00 to 19.00

Birmingham

BIRMINGHAM, ALA., Jan. 27.

Pig Iron.—Sales the past week were the largest since November. All makers, with one exception, obtained \$40 for all bookings whether for spot or any portion of the first half. The one exception is credited with having sold 6000 to 7000 tons at \$38, but after that, raised to \$40 and made it universal. The interest thought to have sold at \$38 has connections different from those of any other Alabama maker. At the close of the week, there was none but \$40 iron with all interests more freely in the market than at any time since Dec. 1, when the raise from \$29 to \$40 began. Freer selling is understood to be due to thorough satisfaction with the present price and an apparent preference for it to remain there. Sales in the Chicago district and the Middle West were particularly large, although the bookings covered practically all fields. One interest, which sold 4000 tons at \$38 just prior to the \$40 mark, sold 6000 tons at the latter figure. All makers admit having made sizeable bookings during the week, the average running from 4000 to 8000 tons. Almost all steel works are operating to capacity. This is especially true of the wire drawing departments of the Gulf States Steel Co. and the American Steel & Wire Co. The Conners-Weymann Steel Co. is on full turn in both hoop and tie mills at Woodlawn and Helena. The Birmingham Steel Corporation has entered the structural steel business and is turning out bridge and building shapes. Extreme effort is being made by

exporters to secure steel shapes. A Holland agent tried to place orders for 30,000 tons of ship plates and another exporting house made vain effort to place orders for 10,000 tons of steel and iron bars. The export pig iron inquiry is also active. The Gulf States Steel Co. is doing a large export business. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, sil. 1.75 to 2.25.	\$40.00
Basic	39.00
Charcoal	50.00

Cast Iron Pipe.—The leading interest advanced prices from \$63 and \$60 to \$66 and \$63 on Monday. A lot of new business was booked a few days before this on receipt of notice that the advance would be made, Atlanta coming in for 700 tons of water pipe. Macon, Ga., also sent in an order for pipe. Flange pipe making capacity of shops is reported as booked for six to eight months.

Coal and Coke.—There is a dearth of coke for outside business, but the Southern trade is well cared for. The coal output is now restricted by a semi-car famine owing to the diversion of a lot of cars to other States with Alabama coal during the strike. Proffers of large orders for high-grade coal for export purposes were turned down because there is no storage capacity at Mobile or Pensacola.

Old Material.—Scrap dealers have done an excellent business for some time and the higher price scale remains firm with tendency to further advance. Stocks are running low. Both heavy steel and No. 1 cast are active. We quote per gross ton f.o.b. Birmingham yards, prices to consumers, as follows:

Steel rails	\$21.00 to \$22.50
No. 1 heavy steel.	20.00 to 21.00
Cast iron borings	14.00 to 15.00
Machine-shop turnings	14.00 to 15.00
Stove plate	25.00 to 26.00
No. 1 cast.	27.50 to 29.00
Car wheels	27.50 to 29.00
Tramcar wheels	26.50 to 28.00
Steel axles	29.00 to 30.00
No. 1 wrought	24.00 to 25.00

New York

NEW YORK, Jan. 27.

Pig Iron.—Sales of pig iron during the past week have been very heavy. One Buffalo company sold about 100,000 tons of foundry iron for second half at \$38 to \$40, and is now out of the market. The New York office sold 30,000 tons of the total. The leading Virginia company came into the market last Saturday and is selling on a basis of \$40 for No. 2 plain for the last half. All Virginia furnaces are taking business for last half except one, and \$40 is the price of all except one, which asks \$40.25, and one which asks \$42. Prices in eastern Pennsylvania show considerable variation, the highest price being \$44.25 for No. 2X at furnace and \$43 for No. 2 plain. At Buffalo prices also vary to a considerable extent, but \$41 for No. 2 plain at furnace is considered minimum. A pump company which has been in the market for about 15,000 tons for last half has bought a large part of that tonnage. A cast iron pipe company has bought 6000 to 7000 tons. An inquiry for 5000 tons of basic for export is pending. Most foreign inquiry comes from Italy, but little exporting is being done on account of unfavorable exchange and other conditions. We quote delivery to New York as follows:

No. 1 foundry, sil. 2.75 to 3.25.	\$46.05 to \$47.05
No. 2X, sil. 2.25 to 2.75.	45.05 to 46.05
No. 2 plain, sil. 1.75 to 2.25.	43.80 to 44.80
No. 2X, Virginia, sil. 2.25 to 2.75.	44.40 to 45.40

Ferroalloys.—The spiegeleisen market is very strong with sales in the last week of several hundred tons at \$55, furnace. The minimum quotation is now \$57.50, furnace, with demand strong. Sales have been made for export of two lots of 500 and 1000 tons each to Belgium and Holland, respectively, the price for the latter being reported at \$58.25. The ferromanganese market is quiet but exceedingly strong. Sales of about 1000 tons of domestic alloy from a producer who has recently started his furnaces are reported at \$150 to \$160, delivered, for shipment running up to the first of July. Outside of spot lots which have sold at around

this level, this is the only domestic alloy available for the first half. For second half producers are understood to be considering \$160, delivered, and it is stated that any sales must be a matter of negotiation. One representative of a British producer has from 2000 to 3000 tons for shipment from May on which he is offering at \$145, seaboard, and one representative still has 500 tons for which the asking price is \$150, seaboard. Demand in general is reported as moderate. Manganese ore is extremely scarce and prices are very strong, 80c. per unit having been realized on a recent sale of foreign ore. Ferrosilicon, 50 per cent, is in moderate demand, and is obtainable at \$80 per ton, delivered.

Finished Iron and Steel.—Although some mills are said to have free tonnage for second quarter, there is still no disposition to sell. One of the largest independent companies is practically out of the market, or is taking what it calls a recess. Only such tonnage as can be gotten out in first half is considered at all, and on structural work it will remain out of the market until March 1. Prices are anything over a wide range, dependent in part on the time of delivery, and the buyer's willingness to name a price high enough to break down the seller's reluctance. Quotations of 4c. on sheared tank plates are more common, but universal plates are obtainable on a few weeks' delivery at 3.50c., except for an attractive lot on which 3.25c. could doubtless be done. On 3000 tons of ship plates for a New York yard 3.50c. was paid. A Seattle shipbuilding company is actively in the market with special urgency on early rolling of 2000 tons on which 3.50c. has also been quoted. Export sales for the second quarter have been done at 3.50c., while sheets have brought all of \$20 a ton about the March 21 schedule. On bar iron some business has been done at 3.50c., Pittsburgh, but 3.75c. has been quoted and obtained by a few makers. A small tonnage of forging billets has gone at \$71.50, Pittsburgh. The steel trade has received tentative inquiries for the steel on about 4000 cars for the railroads, but the interesting development in railroad buying is the use made by the War Department of its right, in that we are still technically at war, to allocate rail tonnages; the result is that mills which have consistently maintained a price of \$57 for open-hearth rails against a more general quotation of \$47 are asked to roll rails under war conditions with the price to be fixed later. The episode is regarded as an eleventh hour acknowledgment of needs which the rail mills would have been glad to satisfy months ago. On six piers for New York City at Staten Island, about 6000 tons, the Bethlehem Steel Bridge Corporation was low bidder but at that about \$700,000 in excess of the appropriation. The State of New York has invited bids on a suspension bridge over Rondout Creek at Kingston, involving upward of 1500 tons, but likely also to cost more than the money available. Other new work includes the First National Bank Building, Jersey City, 1450 tons. Awards include 400 tons for a power house extension at Warren, Ohio, to the Pittsburgh Bridge & Iron Co.; 1500 tons for 10 tanks for the White Oil Co., Houston, Texas, to the United Iron Co., Kansas City; 3000 tons for the John Hancock Building, Boston, to the New England Structural Co.; 1500 tons for the Humble Oil office building, Houston, probably to the Virginia Bridge & Iron Co., and 700 tons for the Armour fertilizer works, Baltimore, to the Phoenix Bridge Co.

We quote for mill shipment, New York, as follows: Soft steel bars, 2.62c. to 4.27c.; shapes, 2.72c. to 2.82c.; plates, 2.92c. to 4.27c., the minimum prices being for indefinite delivery and the higher prices for the first quarter; bar iron, flats, wider than 6 in., 4.07c.; $\frac{3}{4}$ and $\frac{7}{16}$ in., round and square, 4.47c.; light rounds, squares and flats, 4.77c., and other sizes, 3.77c.

Warehouse Business.—Feverish inquiry for materials of all kinds shows no abatement, although jobbers' stocks are badly broken. Opinions differ as to how long the high pressure of demand will continue. Some warehousemen expect that increasing prices will act eventually to stop buying; but premium prices are still willingly paid for essential and special materials required to maintain factory operations. There is a growing disposition to cease stocking warehouses at present high prices, uncertainty as to the limit consumers will pay being the chief concern. This hesi-

tancy is strengthened by increasing reluctance to place orders with mills now taking future business on the basis of price adjustment at time of delivery. Marketing conditions are generally considered so unstable as to inject too great an element of speculation in such an arrangement. On the other hand some warehousemen expect the release of well-financed railroads by the Government to make transportation needs preferred mill bookings, and such jobbers are disposed to seek stocks for their trade against this time. For sheets 8.50c. has been paid for No. 10 blue annealed, 8.50c. for 28-gage black, and 10c. for 28-gage galvanized. We quote out-of-store prices: Steel bars, 3.52c. to 4c.; structural shapes, 3.47c. to 3.90c.; plates, 3.67c. to 4.25c.; No. 10 blue annealed sheets, 5.07c. to 5.80c.; 28-gage box annealed black, 6.50c. to 7c.; 28-gage galvanized, 7.75c. to 9.50c.; shafting and screw stock, rounds, 5.15c. to 5.25c.

Cast-Iron Pipe.—There is considerable inquiry from foreign sources for pipe, one of which is from South America and totals 22,000 tons. The United States Cast Iron Pipe & Foundry Co. was awarded the contract for supplying the city of New Bedford, Mass., with 2000 tons; the Warren Foundry & Machine Co. was awarded 100 tons for Leominster, Mass. We quote 6 in. and heavier at \$67.30, New York; 4 in., \$70.30, with \$2 additional for Class A and gas pipe.

Old Material.—The week has seen another marked rise in prices due to the scarcity in some items. Heavy melting steel has advanced the least, the chief raises being in cast scrap, car wheels, pipe and stove plate. Large quantities of railroad steel are being shipped from this district to Ohio and western Pennsylvania, and much cast scrap is being sent to New England. Sales of No. 1 machinery cast have been made at \$40.50, delivered. Clean cast borings have been delivered in New Jersey for \$24. Some items are practically impossible to obtain, notably car wheels. Prices which brokers and dealers are paying per gross ton, New York, follow:

Heavy melting steel.....	\$21.50 to \$22.00
Rerolling rails	30.00 to 31.00
Relaying rails, nominal.....	47.00 to 48.00
Steel car axles	33.00 to 34.00
Iron car axles	43.00 to 43.50
No. 1 railroad wrought.....	31.00 to 31.50
Wrought iron track.....	24.00 to 25.00
Forge fire	16.50 to 17.00
No. 1 yard wrought, long.....	25.00 to 26.00
Light iron	7.00 to 8.00
Cast borings (clean)	19.00 to 20.00
Machine-shop turnings	15.50 to 16.00
Mixed borings and turnings.....	15.00 to 15.50
Iron and steel pipe (1 in. min. diam., not under 2 ft. long).....	20.50 to 21.50
Stove plate	26.00 to 27.00
Locomotive grate bars.....	26.00 to 27.00
Malleable cast (railroad).....	27.00 to 27.50
Old car wheels	37.00 to 37.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton:

No. 1 machinery cast.....	\$38.00 to \$39.00
No. 1 heavy cast (columns, building materials, etc.) cupola size.....	36.00 to 37.00
No. 1 heavy cast, not cupola size.....	28.00 to 29.00
No. 2 cast (radiators, cast boilers, etc.)	28.00 to 29.00

Boston

BOSTON, Jan. 27.

Pig Iron.—Buying continues active, the sales for the past week approximating those of the previous seven days, namely, in the neighborhood of 20,000 tons. Embargoes on the New Haven and Boston & Maine railroads, together with heavy snows in the North and the banking of some eastern Pennsylvania furnaces owing to lack of coke, have slowed up movement of iron into New England. Some consumers show anxiety. The bulk of the iron bought recently was for second half delivery and in 500 ton lots or less, only two sales of more than 1000 tons being reported. Prices take a wide range. Eastern Pennsylvania sold on \$42 to \$45 furnace base, the average being \$43, an advance of \$1. New Britain, Conn., Springfield, Mass., Rhode Island and other interests bought silicon 2.75 to 3.25, last half iron, at \$44.50 furnace. One Rhode Island consumer

bought 600 tons eastern Pennsylvania No. 2 X, last half iron, at \$43 furnace and 500 tons Niagara at \$43.15 delivered. Buffalo iron sold at average of \$40 to \$42. A Providence consumer bought 1500 tons at \$42 furnace base. The Laconia Car Co., Laconia, N. H., bought silicon 2.50 to 3.25, March and April delivery, at about \$41 furnace, and another concern silicon 2.75 to 3.25, second half iron, at \$45. The range on Virginia iron is more normal, \$40 to \$41, mostly \$40 to \$40.25 furnace, due to lack of offerings. The Draper Corporation, Hopedale, Mass., has covered its requirements, its last purchase being of Virginia on a \$41.25 furnace base. Alabama iron is quiet at \$40 furnace. The Eastern Malleable Iron Co., Naugatuck, Conn., is in the market for 5000 to 10,000 tons, third quarter malleable. Saco-Lowell Shops, Boston, wants 500 tons silicon 2.75 to 3.25 second and third quarter Southern iron. Susquehanna has blown in its second furnace.

Eastern Pennsylvania, No. 2 X, silicon 2.25 to 2.75.....	\$46.15 to \$47.15
Eastern Pennsylvania, No. 2 plain, silicon 1.75 to 2.25.....	44.90 to 45.90
Buffalo, No. 2 X, silicon 2.25 to 2.75.....	45.15 to 47.15
Buffalo, No. 2 plain, sil. 1.75 to 2.25.....	43.90 to 45.90
Virginia, No. 2 X, silicon 2.25 to 2.75.....	45.95 to 46.95
Virginia, No. 2 plain, sil. 1.75 to 2.25.....	44.70 to 45.70
*Alabama, No. 2 X, silicon 2.25 to 2.75.....	47.85
*Alabama, No. 2 plain, sil. 1.75 to 2.25.....	45.75

*Alongside Boston prices.

Finished Iron and Steel.—The Boston & Maine Railroad has bought 10,500 tons of rails from the Lackawanna Steel Co. and a similar amount from the Bethlehem Steel Corporation. The Maine Central and New Haven railroads have not covered their rail requirements. The Boston Elevated Railway bought 600 tons, for subway use, from the Bethlehem Steel Corporation. The Barbour, Stockwell Co., Cambridge, Mass., has not covered its 1920 rail requirements. One independent steel mill representative has advanced bar iron to 3.25c. and iron bands to 3.50c. base f.o.b. Chicago. Most mills are out of the market on small bars, but will accept limited orders for large round and square. It is also possible to buy heavy plates here, but small are difficult to obtain at 3.75c. f.o.b. Pittsburgh or better. Sheets have been offered more freely at 5.70c. f.o.b. Pittsburgh. Sales have been put through by one local house on a 6.70c. base. The Draper Corporation, Hopedale, Mass., bought half its sheet requirements, June delivery, at price ruling at date of shipment. Structural shapes are quoted as high as 5.00c. f.o.b. Pittsburgh, down to 3.00c. on standards. The New England Structural Co. was awarded about 2000 tons structural for the Federal Reserve Bank and about 3000 tons for the John Hancock building. The Bethlehem Steel Corporation will supply columns for both buildings. Stone & Webster have awarded 325 tons to Phoenix Bridge Co. for the American Radiator plant, South Boston.

Jobbers quote: Steel bars, cold rolled rounds, \$6 per 100 lb. base; squares, hexagons, flats, \$6.50 base; soft steel, flats, rounds, squares, \$4.25 base; concrete bars, plain round, square, \$4.25; twisted squares, \$4.75; structural steel under 3 in., \$4.25; structural, 3 in. and over, \$4; tire steel, \$4.95; spring steel open hearth, \$8.75; special, \$12.75; toe calk steel, \$6.25; steel hoops, \$6.45; steel bands, \$5.45; iron, refined, except as follows, \$4.50 base; ½ in., 9/16 in. round, square, and 2½ in. round, square and larger, \$4.90 base; 7/16 in. round, square and smaller, \$5.50 base; over 6 in. wide, \$5.50 base; best refined iron, \$5.50 base; Wayne iron, \$7 base; band iron, \$5.45; hoop iron, \$6.45; Norway iron, \$20; No. 10 blue annealed sheets, \$5.55 base; No. 28 black sheets, \$7.65; No. 28 galvanized sheets, \$8.50; plates, \$4.80 base.

Cast Iron Pipe.—The Republic Iron & Steel Co. has advanced standard black and galvanized pipe 3½ points to conform with a similar upward revision by other interests. Supplies in New England consuming and jobbing hands are exceptionally small, especially of standard sizes. Some mills could increase deliveries were freight cars available, having stocks on ground.

Old Material.—Heavy melting steel is quiet, but stronger, being offered on a Pittsburgh delivered base of \$26.50 to \$27, and at \$27.50 Ohio delivery. The Bethlehem Steel Corporation is in the market for off-grade steel. The Lebanon Valley Iron & Steel Co., Lebanon, Pa., is in the market for pipe, but not buying, as dealers advanced prices \$2. Machine shop turnings have sold at \$19.50 delivered Harrisburg and Phoenixville, Pa.,

but little New England interest is shown in turnings or borings. Strictly No. 1 cast has sold to nearby consumers at \$40 to \$41 delivered, and mixed Nos. 1 and 2 at \$37, but buyers of No. 2 cast appeared to be filled up for the time being at least. Stove plate continues in demand with light supply. Nearby interests have bought everything offered at \$28 delivered.

Following are the highest bidders for the 675 tons of old material offered for sale last week by the Navy Department, Charlestown Navy Yard: Luria Bros. & Co., Inc., 100 tons borings and turnings, 75 tons galvanized iron and cable scrap; Perry, Buxton, Doane Co., 150 tons structural steel, 100 tons heavy chain, 100 tons burnt cast iron; J. Lipsitz & Co., 50 tons light iron cable; Roxbury Iron & Metal Co., 100 tons galvanized pipe scrap. No awards have been made as yet. Prices paid by dealers at yard follow:

No. 1 heavy melting steel.....	\$22.50 to \$23.50
No. 1 railroad wrought.....	27.00 to 28.00
No. 1 yard wrought.....	23.50 to 24.50
Wrought pipe (1 in. in diameter, over 2 ft. long).....	19.00 to 20.00
Machine-shop turnings.....	14.50 to 15.00
Cast-iron borings.....	16.50 to 17.50
Heavy axle turnings.....	15.50 to 16.00
Blast furnace borings and turnings.....	13.50 to 14.50
Forged scrap.....	14.00 to 15.00
Bundled skeleton.....	15.50 to 16.50
Steel car angles.....	27.00 to 28.00
Car wheels.....	31.00 to 32.00
Machinery cast.....	34.00 to 35.00
No. 2 cast.....	32.00 to 33.00
Stove plate.....	25.00 to 26.00
Railroad malleable.....	24.00 to 25.00
Re-rolling rails.....	28.00 to 29.00

St. Louis

St. LOUIS, Jan. 26.

Pig Iron.—During the past week there has been increased inquiry for pig iron, with a considerable number of sales for first half, for third quarter and for last half delivery. These sales have been chiefly of gray iron with a good percentage of malleable, the individual tonnages ranging from 100 to 1500 tons. A considerable number of inquiries for iron, ranging from 100 to 1000 tons are still outstanding with the aggregate rather difficult of determination because of the duplication of inquiry among different furnace representatives. A good proportion of the sales made were handled by the local furnace on a basis of \$42 furnace for malleable and \$40 for foundry iron. The best quotation for No. 2 Southern in the market has been \$40 Birmingham basis, but Southern furnaces seem to be out of the market for the most part.

Coke.—No business of consequence appeared in coke because of the indisposition of ovens to take any additional business until the price question is relieved of the Government regulation.

Finished Iron and Steel.—In finished products the mill representatives report increasing disposition to buy, but inability to promise deliveries is a handicap which is affecting the closing of transactions of any consequence. Some small inquiries from inter-urbans and from projects have appeared in the rail line, but none has been closed. The recent standard rail transactions remain subject to the return of the roads to the owners, the Railroad Administration having declined to place the orders as of its own responsibility. The roads, therefore, will make their own arrangements. Movement out of warehouse is in bad shape because of the failure to receive adequate shipments to cover the demand, although there has been some improvement in the receipts of structural material and blue annealed sheets. Bars are in much worse delivery.

For stock out of warehouse we quote as follows: Soft steel bars, 3.44c.; iron bars, 4.09c.; structural material, 3.54c.; tank plates, 3.74c.; No. 10 blue annealed sheets, 5.34c.; No. 28 black sheets, cold rolled, one pass, 6.60c.; No. 28 galvanized black sheet gage, 8.10c. Light sheets and bars are reported in more difficult situation so far as deliveries are concerned.

Old Material.—Some local plants are using a percentage of scrap as high as 70 per cent in their mixture in place of pig iron, and some open-hearth interests, which are also heavy producers of pig iron are using a larger proportion of steel in their furnaces and disposing of their pig iron at the high prices now

prevailing. These interests are accordingly in the market for a big tonnage of heavy melting steel, way beyond their former requirements. With heavy melting steel at \$27, or even \$30, and pig iron at \$44 or \$45, it would give them a nice turn over. Shortage of cars and of labor are tending to add to hardships of shippers.

Old iron rails	\$31.50 to \$32.00
Old steel rails, rerolling.....	34.50 to 35.00
Old steel rails, less than 3 ft.....	30.50 to 31.00
Relaying rails, standard sections, subject to inspection	45.00 to 50.00
Old car wheels.....	33.50 to 34.50
No. 1 railroad heavy melting steel...	26.50 to 27.00
Heavy shoveling steel.....	23.50 to 24.00
Ordinary shoveling steel.....	23.00 to 23.50
Frogs, switches and guards, cut apart	27.00 to 27.50
Ordinary bundled sheets.....	16.00 to 16.50
Per Net Ton	
Heavy axle and tire turnings.....	19.00 to 19.50
Iron angle bars	28.00 to 28.50
Steel angle bars	24.50 to 25.00
Iron car axles	38.00 to 38.50
Steel car axles	35.00 to 35.50
Wrought arch bars and transoms.....	33.00 to 33.50
No. 1 railroad wrought.....	26.50 to 27.00
No. 2 railroad wrought.....	25.00 to 25.50
Railroad springs	24.50 to 25.00
Steel couplers and knuckles.....	25.50 to 26.00
Locomotive tires, 42 in. and over, smooth inside	26.00 to 26.50
No. 1 dealers' forge.....	23.00 to 23.50
Cast iron borings.....	15.00 to 15.50
No. 1 busheling	24.00 to 24.50
No. 1 boiler, cut to sheets and rings.	19.00 to 19.50
No. 1 railroad cast.....	34.50 to 35.00
Stove plate and light cast.....	30.50 to 31.00
Railroad malleable.....	26.50 to 27.00
Agricultural malleable.....	26.00 to 26.50
Pipes and flues.....	20.50 to 21.00
Heavy railroad sheet and tank.....	20.00 to 20.50
Railroad grate bars	30.00
Machine-shop turnings.....	15.50 to 16.00
Country mixed	22.50 to 23.00
Uncut railroad mixed.....	23.50 to 24.00
Horseshoes	24.00 to 24.50

Philadelphia

PHILADELPHIA, Jan. 27.

Secretary of War Newton D. Baker, on behalf of the United States Railroad Administration, has issued to the steel companies which have rail-making capacity a commandeering order for rails, the total tonnage for early delivery so commandeered being estimated here at about 75,000 tons, to be distributed among several roads. February rollings are required on this tonnage, and in addition the Railroad Administration has ordered probably 50,000 to 75,000 tons for later delivery. Secretary Baker issued the commandeering orders under the war powers conferred upon him and which are still operative because technically the country is not yet at peace.

The price which the Government signifies must be granted by the mills is \$47, mill, for open-hearth steel. While this has been and still is the official price of the United States Steel Corporation, the independent mills have quoted higher. The Cambria Steel Co. and the Bethlehem Steel Co. have been quoting for some time past, \$55 on Bessemer and \$57 on open-hearth and the latter company has booked some business at these prices. The Cambria rail mills have been idle, except for some light rail rollings, since before the steel strike.

A phase of the situation which is of interest to all steel consumers is that there is a shortage of steel at nearly all plants and if steel goes into rails, it cannot, obviously, be used to get out products contracted for by the general consuming trade. In the case of the Cambria steel plant at Johnstown, Pa., the situation is even more serious. This plant has been assigned 26,000 tons of rails for February rolling and its present steel output does not exceed 75,000 tons a month, or about 50 per cent of capacity. If one-third of its steel is taken for rails, it will be necessary to shut down some of the shape mills and one effect of this will be to delay, if it does not entirely stop, work on 2500 freight cars being gotten out in the car shops for the Pennsylvania Railroad. To a greater or less degree, the other steel companies will be similarly affected by this sudden demand of the Railroad Administration for rails.

For nearly a year the steel trade has been aware that the railroads were urgently in need of rails and

the 200,000 tons placed by the Railroad Administration several months ago was only a drop in the bucket compared with the potential requirements of the roads, which have been estimated at close to 2,000,000 tons.

While no explanation has been given by the Railroad Administration as to why it has delayed so long in ordering more rails, it is assumed in the trade that delay was due to dissatisfaction over the prices quoted by the independents. Director General Hines evidenced his dissatisfaction with the \$45-\$47 prices at the time that former Secretary of Commerce Redfield tried to inaugurate his plan of price stabilization nearly a year ago. The Cambria Steel Co. was the first to advance to \$55 and \$57, but later this price was adopted by the Bethlehem Steel Co. The Lackawanna Steel Co. is reported to have no official price, but has sold small lots at the same schedule.

Some weeks ago the Pennsylvania Railroad came into the market for 200,000 tons of rails for 1920 delivery. Distribution was finally effected to the extent that a place on the mill schedules was obtained. One mill quoted no price, but agreed to bill the order at the price which other roads were paying at time of shipment. The railroad came back with a counter proposal that the price should be "mutually satisfactory." There the matter still rests. Another mill quoted \$57, and was not anxious to book any of the tonnage because its steel-making capacity was not, and still is not, equal to the demands of the other finishing mills.

In addition to the rails commandeered for the Railroad Administration, orders have been placed with an Eastern mill for 1500 tons for the Philadelphia & Reading Railroad and 1000 tons for the Central Railroad of New Jersey. Inquiries have been put out by the Richmond, Fredericksburg & Potomac Railroad for 7000 to 9000 tons of 100-lb. rails and by the Philadelphia & Reading for 5000 to 10,000 of 100-lb. rails, deliveries over the remainder of the year in both instances.

The Pennsylvania Railroad has placed large orders for track supplies, including 600,000 tie plates, about 3600 tons, which sold at 3c., Pittsburgh; 600,000 heat-treated track bolts, 500,000 or more ordinary track bolts and 10,000 kegs of standard spikes.

Pig Iron.—More activity in foundry iron was in evidence during the past week. An Eastern furnace sold from 25,000 to 30,000 tons, mostly for second half, but on a portion of the business deliveries run from February. A Buffalo interest, which has sold up for second half, disposed of 10,000 tons or more in this district. There have been sales also by two Buffalo furnaces of about 3500 tons of malleable iron for second half, with nearly that much more tonnage pending. The leading Virginia interest and two other Virginia furnaces have opened their books for second half business. Many of the Eastern furnaces have quietly booked considerable tonnage for the latter half of the year approximately at the prices for early delivery. One exception was a sale of 5000 tons of foundry iron on the basis of \$40.25, furnace, for 1.75 to 2.25 per cent Silicon. There are reports of other price concessions on forward delivery iron, but the firmness of the foundry iron situation has not been materially affected, especially in view of the growing scarcity of coke and the probability that as soon as Government control of prices is ended, which will come when the treaty of peace is ratified, coke prices will be much higher. It is freely predicted that blast furnace coke will go to \$10 or higher when the Lever law becomes inoperative. Most of the Eastern furnaces are covered on coke for first half, but have none bought for second half. Moreover, the probability of increased freight rates following the return of the railroads to private ownership is another factor which tends to stiffen the views of sellers as to the future course of pig iron prices. Most of the Eastern furnaces are quoting \$42, furnace, for No. 2 plain iron and \$1.25 higher for No. 2 X, but this is not the maximum, \$44 and \$45, furnace, having been quoted by a few furnaces on No. 2 X. Malleable iron sold in this district by Buffalo furnaces brought \$41.25, Buffalo, with a freight rate of \$3.90, making a delivered price here of \$45.15. No sales of basic iron are reported, but a Delaware steel plant has been trying to buy. Quotations are reported to be generally on the basis of \$40, furnace. Low

phosphorus iron is quiet. The leading maker of Lake Superior charcoal iron opened its books last week and sold about 25,000 tons in less than 48 hours. It then adopted a more conservative selling policy and advanced its price. Its first sales were on the basis of \$45, furnace, which later was advanced to \$50, furnace, and sales were limited to 1000 tons to a customer. Some of this iron will come East, but most of it was sold in the Central West. Foundry iron users in the Central West have come to this market for iron and sales of Virginia metal have been made for shipment as far as Wisconsin. The reason for this far-flung demand is the banking of some Western furnaces on account of coke shortage.

The following quotations are for iron delivered in consumers' yards in Philadelphia or vicinity, except those for low phosphorus iron, which are f.o.b. furnace:

Eastern Pa., No. 2X, 2.25 to 2.75 sil.	\$44.35 to \$45.35
East. Pa., No. 2 plain, 1.75 to 2.25 sil.	43.10 to 44.10
Virginia No. 2 plain, 1.75 to 2.25 sil.	44.10
Virginia No. 2X, 2.25 to 2.75 sil.	45.35 to 45.60
Basic deliv. Eastern Pa.	39.25 to 40.00
Gray forge	40.50 to 41.50
Standard low phos. (f.o.b. furnace)	48.00 to 49.00
Malleable	45.15
Copper bearing low phos. (f.o.b. furnace)	45.00

Bars.—An Eastern mill has sold 1000 tons of forging bars at 450c., Pittsburgh, which includes an extra of 25c. per 100 lb. Deliveries are to be made in first and second quarter. Another mill has advanced its bar price to 4c., Pittsburgh, and on hoops, bands and strips has advanced to 4.25c., Pittsburgh, but is taking very little business, and then only when customers will accept shipment at mill convenience. The bar iron situation is stronger, and though lots of 10 tons and over are still being sold on the basis of 3.50c., Pittsburgh, an advance soon to 3.75c. is predicted.

Sheets.—A local mill making blue annealed sheets now quotes a price of 4.55c., Pittsburgh, and small lots have been sold on this basis. No large lots are being taken and deliveries are somewhat uncertain, as the mill is sold up until May. The new price is \$20 a ton higher than that which went into effect on March 21, 1919. There appears to be no easing up in the sheet situation. Buyers are scouring the country for supplies without much success.

Old Material.—A Delaware steel plant has offered \$26, delivered, for melting steel. A dealer offered a tonnage at \$27 and another made an offer at \$27.50, but it is reported that these offers were turned down. With \$28.50 to \$29, delivered, obtainable in the Pittsburgh district, the trade is not inclined to consider Eastern business at lower than \$27.50. Other grades of scrap are strong and further advances are noted. Carwheels are almost unobtainable.

No. 1 heavy melting steel	26.00
Steel rails rerolling	36.00 to 38.00
No. 1 low phos., heavy, 0.04 and under	30.00 to 32.00
Car wheels	38.00 to 40.00
No. 1 railroad wrought	35.00 to 36.00
No. 1 yard wrought	30.00 to 31.00
No. 1 forge fire	20.00 to 21.00
Bundled skeleton	20.00 to 21.00
No. 1 busheling	23.00 to 24.00
No. 2 busheling	18.50 to 19.50
Turnings (short shoveling grade for blast furnace use)	19.00 to 20.00
Mixed borings and turnings (for blast furnace use)	18.00 to 18.50
Machine-shop turnings (for rolling mill and steel works use)	20.00 to 21.00
Heavy axle turnings (or equivalent)	22.00 to 23.00
Cast borings (for rolling mills)	23.00 to 24.00
Cast borings (for chemical plant)	25.00 to 27.00
No. 1 cast	38.00 to 39.00
Railroad grate bars	29.00 to 30.00
Stove plate	27.00 to 28.00
Railroad malleable	29.00 to 30.00
Wrought iron and soft steel pipes and tubes (new specifications)	25.00 to 26.00
Iron car axles	45.00 to 46.00
Steel car axles (f.a.s. New York for export)	39.00 to 40.00

Plates.—The demand for plates shows no abatement. Many inquiries are being turned down. Buyers from as distant points as Dallas, Texas, Youngstown, Ohio, and Chattanooga, Tenn., have come to this market in an effort to place orders. Delivery, not price, is the object and sellers report they could easily obtain 4.50c., Pittsburgh, if they could accept orders for delivery within

the next 60 or 90 days. A Seattle shipyard is in the market for 10,000 tons. A lower ocean freight rate to the Pacific Coast makes it possible to ship plates from Pittsburgh to New York and thence to the Coast by water at \$1.02 per 100 lb. as compared with a rail freight rate from Pittsburgh of \$1.25. With this advantageous water rate, considerable shipyard tonnage from the Pacific Coast would come to Eastern mills if they were able to book the business. Having their choice of specifications, mills are generally turning down light plates, which are being offered in large tonnages. Prices have been advanced to 4c., Pittsburgh, by two Eastern mills and it would be difficult to place much business in this district at anything less.

British Prices Soaring

Belgian Pig Iron Delivered—Semi-Finished Steel and Tin Plate Getting Beyond Control

(By Cable.)

LONDON, ENGLAND, Jan. 26.

The pig iron market is unaltered, the possible settlement of the molders' strike being a bull point. There is an active demand for export, especially from Japan and Belgium, with Canada also inquiring, but iron cannot be spared except for the Allies. An increased output is prevented by a shortage of fuel, iron ore and the chaos in traffic. Germany is inquiring for hematite iron, but makers do not fancy German business. Business with Italy is very difficult because of financial conditions. About 1000 tons of Belgian pig iron has arrived.

The semi-finished steel market has gone mad, Welsh sheet bars being quoted at £25 for April-June delivery, with £23 paid for Welsh tinplate bars for July delivery. The scant supply of light steel plates is hindering shipyards, some deliveries being a year behind. The general inquiry for structural material and pig iron is unappeasable.

The strike of dock workers at Barrydock is preventing Welsh collieries from working regularly. This and traffic conditions are resulting in irregular working of Welsh plants, some being closed temporarily.

The demand for tinplate is unabated and the tone of the market is panicky with speculative buying by merchants, and prices are rampant on an immediate rise of 40 per cent in wages and an advance in tinplate bars, for which £23 has been paid. Workers are now demanding that the flat rate war bonus of 140 per cent on total earnings replace the present graded war bonuses. Three-hundred thousand oil sizes have been placed with Welsh makers at 64s. for 14 x 18½ in. for July-September shipment, with an equal quantity wanted for the last quarter. The basis price is now 70s. for 14 x 20 in., which has been paid for March delivery, but the market is quite out of hand. Welsh makers have shipped tinplate direct to Hamburg.

Galvanized sheets are very strong, makers being unable to cope with the demand for thin specifications. The basis price is about £48 10s. for May-June shipment.

We quote per gross ton, except when otherwise stated, f.o.b. makers' works, with American equivalents figured at \$3.60 for £1, as follows:

	£	s.	d.	£	s.	d.	
Ship plates	22	10	0	to	24	10	0 \$81.00 to \$83.20
Boiler plates	26	10	0	to	29	0	0 95.40 to 104.40
Tees	20	10	0	to	22	0	0 73.80 to 79.20
Channels	19	15	0	to	21	5	0 71.10 to 76.50
Beams	19	10	0	to	21	0	0 70.20 to 75.60
Round bars, ½ to 3 in.	23	0	0	to	24	0	0 79.20 to 86.40
Rails, 60 lb. and up	18	15	0	to	19	5	0 67.50 to 69.30
Billets	23	0	0				82.80
Steel hoops	23	15	0	to	29	0	0 103.50 to 104.40
Tin plates	0	70	0				12.60
Sheet and tin plate bars,							
Welsh	23	0	0	to	25	0	0 82.80
Galv. sheets, 24 g.	48	10	0				174.60

STEEL CORPORATION REPORT

Showing for Last Quarter Excellent in Spite of the Strike—Usual Dividends

The report of the United States Steel Corporation for the last quarter of the year 1919 was more favorable than had been expected. On account of the steel strike, which extended over a considerable part of the period, it was expected that there probably would be nothing left for surplus after the payment of the usual dividends, but after these payments the surplus for the quarter was \$5,222,288. The earnings were \$35,791,302, compared with \$40,177,232 for the third quarter. This does not, however, indicate that there was a loss of \$5,000,000 due to the strike, as the second quarter earnings were only \$34,331,301. The net earnings for the past four years by quarters have been as follows:

Quarters	1919	1918	1917	1916
First	\$33,513,384	\$56,961,424	\$76,756,018	\$60,713,624
Second	34,331,301	62,557,391	90,579,204	81,126,048
Third	40,177,232	42,961,589	68,243,784	85,817,067
Fourth	35,791,302	36,354,165	59,724,125	105,968,347

Net earnings each year: \$143,813,219 \$198,834,569 \$295,303,131 \$333,574,177

The statement of earnings for the quarter ending Dec. 31 was as follows:

Earnings.			
Earnings before charging interest on the Subsidiary Co.'s bonds outstanding	Less interest on the Subsidiary Co.'s bonds outstanding	Balance of Earnings	
October, 1919...	\$11,823,058	\$713,472	\$11,109,586
November, 1919...	12,478,694	709,780	11,768,914
December, 1919...	13,635,167	722,365	12,912,802
	\$37,936,919	\$2,145,617	
Total earnings after deducting all expenses incident to operations, comprising those for ordinary repairs and maintenance of plants, allowances for estimated proportion of extraordinary cost, resulting from war requirements and conditions, of facilities installed and of inventories of materials on hand, also estimated taxes (including Federal income and war excess profits taxes), and interest on bonds of the subsidiary companies			\$35,791,302
Less, charges and allowances for depreciation, applied as follows, viz.: To depreciation and extraordinary replacement funds and sinking funds on bonds of subsidiary companies	\$10,729,256		
To sinking funds on U. S. Steel Corporation bonds.	2,021,771		
		12,751,027	
Net income		\$23,040,275	
Deduct: Interest for the quarter on U. S. Steel Corporation bonds outstanding	\$5,090,100		
Premium on bonds redeemed	254,879		
		5,344,979	
Balance		\$17,695,296	
Add: net balance of sundry charges and receipts, including adjustments of various accounts		185,694	
Total		\$17,880,990	
Dividends on stocks of the U. S. Steel Corporation, viz.:			
Preferred, 1% per cent.	6,304,920		
Common, 1% per cent.	6,353,782		
		12,658,702	
Surplus for the quarter		\$5,222,288	

Crucible Steel Co. of America Increases Stock

The Crucible Steel Co. of America, Pittsburgh, H. F. Kress, secretary, has sent out notice that a special meeting of stockholders of the company will be held in Jersey City, N. J., on Feb. 16, for the purpose of increasing the common stock of the company from \$25,000,000 par value to \$75,000,000 par value. This will give a total capital of \$100,000,000, \$25,000,000 as preferred and \$75,000,000 will be common stock, each share of preferred and common having par of \$100.

IRON AND INDUSTRIAL STOCKS

Transactions Grow Smaller and Prices Show Considerable Irregularity

NEW YORK, Jan. 26.

Trading in stocks has grown smaller of late and prices have shown considerable irregularity owing primarily to money conditions. In the industrial group as a whole, however, the tendency has been upward much of the time of late and iron and steel issues have been notably firmer in spots. Automobile and oil stocks appear to have suffered in value the most.

United States Steel has held around 105, the marked increase in holdings by investors during 1919 having had a favorable market effect. Crucible Steel is much higher because of the recommendation of the directors that the authorized common stock be increased \$50,000,000. The slightly higher range of prices for Bethlehem B is based largely on earnings and dividend talk. Some of the other steel issues have acted less favorably because of the inability of companies to secure cars in which to ship their product. The firmer tendency of pig iron prices has not benefited marketwise such issues as Sloss-Sheffield.

American Car & Foundry and American Locomotive have given a good account of themselves, all things considered, on the general belief in financial circles that the recent election of directors will result in greater working harmony. In fact, most of the equipment issues have shown underlying strength based on estimates of the railroads' needs during the next three years. Recent buying of Worthington Pump & Machinery has been on the belief that its 1919 earnings will run well ahead of those for 1918.

Utah, Anaconda, Chino, Kennecott and, in fact, most of the copper stocks have been heavy on limited dealings notwithstanding the pronounced improvement in the statistical position of the metal market. Railroad shares, generally speaking, have had a downward tendency owing more to their own weight than to any pronounced selling movement.

Carnegie Gift to National Research Council

The Carnegie Corporation of New York has announced its purpose to give \$5,000,000 for the use of the National Academy of Sciences and the National Research Council. It is understood that a portion of the money will be used to erect in Washington a home of suitable architectural dignity for the two beneficiary organizations. The remainder will be placed in the hands of the academy, which enjoys a federal charter, to be used as a permanent endowment for the National Research Council.

The council is an organization based upon some forty of the scientific and engineering societies of the country, which elect delegates to its constituent divisions. It is not supported or controlled by the Government, differing in this respect from other similar organizations established since the beginning of the war in England, Italy, Japan, Canada, and Australia. It intends, if possible to achieve in a democracy and by democratic methods the scientific results which the Germans achieved by autocratic methods in an autocracy while avoiding the obnoxious features of the autocratic régime.

The council was organized in 1916 as a measure of national preparedness and its efforts during the war were mostly confined to assisting the Government in the solution of pressing war-time problems involving scientific investigation. Reorganized since the war on a peace-time footing, it is now attempting to stimulate and promote scientific research in agriculture, medicine and industry and in every field of pure science.

The Hamilton Furnace Co., Hamilton, Ohio, has awarded the contract for a \$100,000 blowing engine to the Hooven, Owens, Rentschler Co., to be used in connection with the second blast furnace to be erected by that company, contract for which is to be let in the near future.

BELGIAN SITUATION

Advancing Prices and Curtailed Production Through Fuel and Rail Disorganization

BRUSSELS, BELGIUM, Jan. 1.—The orders for Belgium of thousands of tons of semi-finished steel placed in the United States have had the result of strengthening prices. They advance anyway from day to day and finished products reflect the same tendency, with the situation aggravated by the condition of exchange with the United States.

The plants of Lorraine, Briey, Esch and Luxemburg refuse to quote. They have order books filled for about five months, and it is not possible to forecast a betterment in operations because of railroad disorganization and low stocks of coal.

In spite of rumors of the liquidation of the Belgian Steel Syndicate, it has not yet come to an end. The life of the great syndicates of France and Belgium are now regarded as dependent on the cartel system which seems to be substantially what has been provided for American industries and also on the tactics of the concentration of German industries. The shortage of semi-finished steel is the cause of greatest concern at the moment, though if coke could be supplied in desirable quantities three of four glass furnaces could be relighted without delay.

Some progress has been made in the restoration of new works. Thus the Société de Sambre-et-Moselle has put into operation its plate mill at Châtelaineau. A second blast furnace has been put into blast at the Ougrée-Marihaye works, which has also put into operation another section of its steel plant. At the Hainaut works one of three blast furnaces had to be banked because of a shortage of ore. It is expected that several metallurgical plants will be started up in the first quarter of 1920.

Nominal prices on the Bourse of Brussels are as follows:

Semi-finished steel, none offered.
Lorraine pig iron, f.o.b. furnace, 470-485 fr. per ton.
Belgian foundry iron, f.o.b. furnace, 425-430 fr. per ton.
Merchant iron, f.o.b. works, 77.5 fr. per 100 kg.
Steel bars, f.o.b. works, 80-82.5 fr. per 100 kg.
Heavy plates, 95-96 fr. per 100 kg.
Medium plates, f.o.b. works, 105-106 fr. per 100 kg.
Shapes and rails (minimum), 70-70.5 fr. per 100 kg.

The Belgian Steel Comptoir consists of thirteen pig iron and steel producers as follows: Cockerill, Providence, Ougrée, Athus-Grivegnée, Boël, Clabecq, Châtelaineau, Espérance-Longdoz, Thy-le-Château, les Usines Métallurgiques du Hainaut, Monceau-Saint-Fiacre, Angleur et Sambre-et-Moselle.

It determines the price of rails, shapes, merchant iron, as well as of semi-finished steel, ingots, blooms, and billets, and distributes orders among the works affiliated.

Iron and Steel Situation in France

PARIS, FRANCE, Jan. 2.—Though the price of coke at the end of the year was 105 fr. per ton, for delivery early in January 145 fr. was obtained. It is announced that the Belgian Coke Syndicate has bought in Germany 80,000 tons of coke and numerous boats are en route for the Liège region. It has been decided that compensation will be given to purchasers for Lorraine works coming into the possession of their new operators on Jan. 1 because of large orders taken at prices hardly remunerative for those plants. The coke will be supplied at about 65 fr. to the end of March. In June or July new prices are to be adjusted.

The Comptoir de Longwy has four blast furnaces in operation, and with more coke should soon have three more working. Then the comptoir could have for disposition about 40,000 tons of foundry iron per month against 25,000 now, or about 450,000 tons per year. It is estimated that the actual needs of the French foundries are about 600,000 to 700,000 tons at a minimum, and thus there is a continuing deficiency existing. The quality of coke is such that 1.3 to 1.4 tons is necessary per ton of iron against 1.1 tons of coke in normal times.

Price advances in steel of 15 fr. per 100 kg. are expected. This means that merchant bars obtainable at 85 fr. per 100 kg. at the end of the year will shortly be at 100 fr. minimum. Much of the rolled steel for railroad work will, it is expected, be about 140 fr., while bands will be quoted at 195 fr.

To help meet the movement of iron, foundrymen in the region of Paris have grouped together to secure whole trainloads of iron from Longwy.

CHINA AN AMERICAN MARKET

Commercial Attache Advocates Engineering College—Industrial Films Valuable

No more promising field offers itself to the American manufacturer of machinery, tools and all kinds of building material for modern structures than China with its vast undeveloped resources, according to Julean Arnold, commercial attache of the Bureau of Foreign and Domestic Commerce, stationed at Peking, China. Mr. Arnold is in the United States on Government business and will remain until after the convention of the National Foreign Trade Council in May. Interviewed by THE IRON AGE on China's possibilities as a market, he said: "Throughout China, electric units are being installed, chiefly for lighting purposes, although in the city of Shanghai electricity is being used for power. China is not Japan's market. Japanese trade with China is large, but the opportunity is so vast that no one country can have a monopoly of the trade."

The Chinese throughout the country have a strong feeling of friendliness for Americans and American products, and Chinese merchants invariably show a preference for dealing with American firms. One of the greatest needs of China to-day, Mr. Arnold believes, is an American college of engineering to train the Chinese students, both Hankow and Shanghai offering excellent locations for such a project. The British have for years maintained such a school in Hong Kong, where the Chinese are trained in British methods and British products. The Germans too, founded a college in Shanghai, which was operated until the war.

Mr. Arnold speaks enthusiastically of the industrial motion picture as a means of furthering trade and introducing American products. Chinese merchants, both small and large, are intensely interested in these films, which are exhibited from time to time by the Bureau of Foreign and Domestic Commerce, in Chambers of Commerce, Chinese trade organizations and societies. During his stay in the United States Mr. Arnold will be either at the Bureau of Foreign and Domestic Commerce in Washington or at the offices of the bureau in the Custom House, New York, and will be glad to receive reels of industrial films from manufacturers to carry back to China.

Buildings for Tokio

The Japanese contract of the George A. Fuller Co., New York, for the construction of buildings in Tokio, is for about \$5,000,000 and includes only two buildings to be erected in Tokio; a 7-story office building about 160 x 160 ft. for the Japan Oil Co., and a 7-story office building about 160 x 290 ft. for the Japan Steamship Co. No purchases of structural steel have been made, despite rumors to the contrary. The engineers being sent to carry out the contract sail from San Francisco Jan. 30, and according to the George A. Fuller Co., plans now under consideration cannot be completed until these engineers have gone over the ground and reported. Although the company has other construction projects in view in Japan and China, at the present time there is no certainty of any other work being done.

A meeting of the American Pig Iron Association was held in the William Penn Hotel, Pittsburgh, on Wednesday, Jan. 21, at which only routine business was transacted. Former officers were elected as follows: T. W. Friend, Clinton Iron & Steel Co., Pittsburgh, president; Col. F. D. Richards, M. A. Hanna & Co., Cleveland, treasurer, and John A. Penton, Cleveland, secretary.

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin, New York	Lead		Spelter	
	Lake	Electro-lytic		New York	St. Louis	New York	St. Louis
Jan.							
21	19.50	19.25	62.75	8.75	8.45	9.55	9.20
22	19.50	19.25	62.50	8.75	8.45	9.55	9.20
23	19.50	19.25	63.00	8.75	8.45	9.50	9.15
24	19.50	19.25	8.75	8.45	9.55	9.20
26	19.50	19.25	62.75	8.75	8.45	9.47½	9.12½
27	19.50	19.25	62.25	8.75	8.45	9.45	9.10

NEW YORK, Jan. 27.

The markets continue quiet with prices fairly firm. Demand for copper is a little better. The tin market continues to fluctuate, largely following conditions in London, and prices are still erratic. The lead market is easier but values are still very firm. The zinc market is quiet and slightly lower. Antimony continues to grow stronger.

New York

Copper.—Demand for copper, while not heavy, is good, and prices are fairly strong. Leading producers continue to quote electrolytic for early delivery at 19.25c. with Lake at 19.50c. New York. In a few cases electrolytic copper can be purchased from second hands at from 18.75c. to 19.25c., but it is believed that the amount is limited and confined to sellers who are forced to close their accounts. A stronger market is looked for in the near future. Copper exports in 1919 are estimated at 226,611 gross tons against 328,844 tons in 1918. The 1919 movement is the lowest in five years.

Tin.—The market has been quiet and sales have been considerably lighter than during the two weeks previous to the week just ended. Prices have fluctuated, generally at lower levels, due largely to the low records made in the value of the pound sterling. There was a little inquiry yesterday with a little business done in future shipment at 63.25c. and in spot metal, which was offered at 62.75c. Because of considerable lower values to-day in exchange quotations for spot Straits have receded to 62.25c., with offers heard of yesterday as low as 62.50c. The fact that possibly some of the banks have been calling in loans is cited as perhaps one reason for some of the selling. Arrivals thus far this month have been 3775 tons, of which 3285 tons are credited to Atlantic ports. Tin afloat is reported as 5155 tons. The London market continues to advance, having been as high as £393 15s. on Monday for spot Straits, with quotations to-day at £393 per ton.

Lead.—The lead market is decidedly quieter and there is little or no demand. Spot lead, which was scarce even at 9c. a short time ago, is now obtainable as low as 8.75c., New York. For the first time in many weeks there is an evidence of some desire on the part of certain interests to make sales. We quote the market for early delivery at 8.45c., St. Louis, or 8.75c., New York, with prompt lead offered from some sources as low as 8.45c., St. Louis. Bids at lower levels at around 8.37½c. to 8.25c. would no doubt result in considerable business. It is believed by some that the crest of the upward movement has been reached and that the effect of larger production will soon be felt actually, if not already evident sentimentally. The quotation of the leading interest continues unchanged at 8.25c., St. Louis, or 8.50c., New York.

Zinc.—Inquiry from galvanizers, particularly for early delivery, has been more in evidence during the past week. To-day, however, demand is light both from domestic consumers as well as from foreign sources. The new low records in exchange have also had their effect and the slight reaction in this market has not been unexpected. Prime Western for early delivery is quoted by most of the large producers at 9.10c., St. Louis, or 9.45c., New York. One broker is offering as low as 9c., St. Louis, but reports little business at this level.

Antimony.—Scarcity of metal, coupled with heavy demand, has resulted in higher values and wholesale lots for early delivery are quoted at 11.25c., duty paid.

Aluminum.—The market is unchanged with virgin metal, 98 to 99 per cent pure, held at 31.50c. to 32.50c. in wholesale lots for early delivery.

Old Metals.—The market is quiet. Dealers' selling prices are reported as follows:

	Cents per lb.
Copper, heavy and crucible.....	20.00
Copper, heavy and wire.....	19.00
Copper, light and bottoms.....	17.00
Brass, heavy.....	14.25
Brass, light.....	10.25
Heavy machine composition.....	19.50
No. 1 yellow rod brass turnings.....	12.00
No. 1 red brass or composition turnings.....	16.50
Lead, heavy.....	7.50
Lead, tea.....	5.50
Zinc.....	6.00

Chicago

Jan. 27.—Copper, lead and spelter prices have declined and the other metals are quoted the same as a week ago. Copper has been rather quiet, although it is now showing signs of revival and is expected to advance considerably within the next 30 days. Tin has been erratic, fluctuating 3c. each way before its return to the level of a week ago. Lead, which has been selling at a premium above the price of the leading producer, is gradually declining to the quotation of the latter. Spelter is weaker as the result of sales at concessions. Antimony is firm rather on account of restricted selling than because of an active demand. There have been no changes in old metal prices. We quote Lake copper 20c. to 20.50c. for carloads, tin 65c. to 67c., lead 8.50c., spelter, 9.25c. and antimony 12c. On old metals we quote copper wires, crucible shapes, 16.50c.; copper clips, 16.50c.; copper bottoms, 15c.; red brass, 16.50c.; yellow brass, 12.50c.; lead pipe, 6.50c.; zinc, 6.50c.; pewter, No. 1, 37.50c.; tinfoil, 40c., and block tin, 52.50c., all these being buying prices for less than carload lots.

St. Louis

Jan. 26.—The non-ferrous markets have been stronger, with a decidedly active demand with car lots quoted as follows: Lead, 8.37½c.; spelter, 9.3c. In less than car lots: Lead, 9c.; spelter, 10c.; tin, 68c.; copper, 21.50c.; antimony, 12.50c. In the Joplin ore district prices have been firmer in sympathy with the strength in zinc and lead. Dealers' prices for miscellaneous scrap metals have also been stronger for the same reason.

Remington War Plants For Sale

The Remington Arms Union-Metallic Cartridge Co. is preparing to sell plants, or parts of plants, built for war needs and now useless to the company. Five new companies have been organized to take over these plants and dispose of them to the highest bidder. They are: the Fairfield Liquidating Co., the East End Realty Corporation and the Bridgeport Liquidating Co., all of Connecticut; the Ilion Liquidating Corporation of New York and the Swanton Liquidating Co. of Vermont. Sales arrangements are in the hands of Joseph P. Day, 67 Liberty Street.

Number of Employees Increases

WASHINGTON, Jan. 27.—The iron and steel industry showed the greatest increase in the number of employees of any industry in December over November, according to the monthly record of the Bureau of Labor Statistics. The increase in number of employees was 18.3 per cent, the number of employees in November being 127,280 and in December 150,600. In no other industry was there an increase of more than 4 per cent. The rapid return of strikers to work during December is shown by the figures.

The Society of Automotive Engineers, 29 West Thirty-ninth Street, New York, will hold a truck and tractor meeting at the Hotel La Salle, Chicago, morning and afternoon of Jan. 28.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

(Prices quoted below represent as closely as they can be given those charged by mills to their regular trade for indefinite shipment. Owing to practical famine in supply of finished steel products and the heavy demand existing, tenders of new business are being made to the mills by jobbers and consumers at higher prices than those quoted below, but as a rule the mills are turning this offered business away.)

Freight rates from Pittsburgh on finished iron and steel products, including wrought iron and steel pipe, with revisions effective Jan. 1, 1920, in carloads, to points named, per 100 lb., are as follows: New York, 27c.; Philadelphia, 25c.; Boston, 29½c.; Buffalo, 21c.; Cleveland, 17c.; Cincinnati, 23c.; Indianapolis, 25c.; Chicago, 27c.; St. Louis, 34c.; Kansas City, 59c.; St. Paul, 49.5½c.; Denver, 99c.; Omaha, 59c.; minimum carload, 80,000 lb. to four last named points; New Orleans, 38.5c.; Birmingham, 57.5c.; Pacific Coast, \$1.25; minimum carload, 80,000 lb. To the Pacific Coast the rate on steel bars and structural steel is \$1.315, minimum carload, 40,000 lb.; and \$1.25 minimum carload 50,000 lb. On wrought iron and steel pipe the rate from Pittsburgh to Kansas City is 50c. per 100 lb., minimum carload, 46,000 lb.; to Omaha, 50c., minimum carload, 46,000 lb.; to St. Paul and Minneapolis, 49.5c., minimum carload, 46,000 lb.; Denver, 99c., minimum carload, 46,000 lb. Jacksonville, Fla., all rail, car lots, 41.5c.; less, 59c.; rail and water, car lots, 34.5c.; less, 46.5c. A 3 per cent transportation tax applies. On iron and steel items not quoted above rates vary somewhat and are given in detail in the regular railroad tariffs.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and tees, structural size, 2.45c.

Wire Products

Wire nails, \$3.25 to \$4.50 base per keg; galvanized, 1 in. and longer, including large-head barbed-roofing nails, taking an advance over this price of \$1.50 and shorter than 1 in., \$2.00. Bright basic wire, \$3 to \$3.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$3 to \$3.50; galvanized wire, \$3.70 to \$3.95; galvanized barbed wire and fence staples, \$4.10 to \$4.45; painted barbed wire, \$3.40 to \$3.75; polished fence staples, \$3.40 to \$4.50; cement-coated nails, per count keg, \$2.85 to \$3.75; these prices are being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 60 per cent off list for carload lots, 59 per cent for 1000-rod lots, and 58 per cent off for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets\$4.15 base
Large boiler rivets\$4.25 base
Small rivets, ¼ in., 5/16 in. and 7/16 in. diameter, 50 per cent off list
Machine bolts, hp. nuts, ¾ in. x 4 in.:
Smaller and shorter, rolled threads, 50 and 10 per cent off list
Cut threads50 per cent off list
Larger and longer sizes40 and 5 per cent off list
Machine bolts, c.p.c. and t. nuts, ¾ in. x 4 in.:
Smaller and shorter40 and 5 per cent off list
Larger and longer35 and 5 per cent off list
Carriage bolts, ¾ in. x 6 in.:
Smaller and shorter, rolled threads, 45 and 5 per cent off list
Cut threads40 and 5 per cent off list
Larger and longer sizes30 and 10 per cent off list
Lag bolts50 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 350 per cent off list
Plow bolts, Nos. 4 to 1050 plus 20 per cent off list
Hot pressed nuts, sq. blank2.50c. per lb. off list
Hot pressed nuts, hex. blank2.50c. per lb. off list
Hot pressed nuts, sq. tapped2.25c. per lb. off list
Hot pressed nuts, hex. tapped2.25c. per lb. off list
C.p.c. and t. sq. and hex. nuts, blank2.50c. per lb. off list
C.p.c. and t. sq. and hex. nuts, tapped2.25c. per lb. off list
Semi-finished hex. nuts:
¾ in. and larger65 per cent off list
9/16 in. and smaller70 and 10 per cent off list
Stove bolts in packages75-10 per cent off list
Stove bolts in bulk75-10-2½ per cent off list
Tire bolts60-10 per cent off list

The above discounts are from Nov. 1, 1919.

All prices carry standard extras, Pittsburgh basis.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, \$52 to \$65; chain rods, \$65 to \$70; screw rivet and bolt rods and other rods of that character, \$65 to \$70. Prices on high carbon rods are irregular. They range from \$75 to \$100, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, ½ in., 9/16 in. and larger, \$3.35 per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ¾ in., 7/16 in. and smaller, \$3.85 to \$4 per 100 lb. in lots of 200 kegs of 200 lb. each or more; track bolts, \$4.90 to \$5.00 per 100 lb. in carload lots of 200 kegs or more, with the usual extras for small lots. Boat and barge spikes, \$3.85 to \$4 per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., \$12.80 per package; 8-lb. coating, I. C., \$14.10; 12-lb. coating, I. C., \$15.80; 15-lb. coating, I. C., \$16.80; 20-lb. coating, I. C., \$18.05; 25-lb. coating, I. C., \$19.30; 30-lb. coating, I. C., \$20.30; 35-lb. coating, I. C., \$21.30; 40-lb. coating, I. C., \$22.30 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars at 2.35c. to 2.75c. from mill. Bar iron, 3.50c.

Wrought Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Steel		Butt Weld		Iron	
Inches	Black Galv.	Inches	Black Galv.	Inches	Black Galv.
1½, 1¼ and ¾	47	20½	38	29½	2½
1½	51	36½	38	30½	3½
¾ to 3	54	41½	38	34½	16½
				30	23½
Lap Weld		Lap Weld		Lap Weld	
2	47	34½	11½	24½	9½
2½ to 6	50	37½	11½	31½	17½
7 to 12	47	33½	2	32½	18½
13 and 14	37½		2½ to 6	34½	21½
15	35		7 to 12	31½	18½
Butt Weld, extra strong, plain ends		Butt Weld, extra strong, plain ends		Butt Weld, extra strong, plain ends	
1½, 1¼ and ¾	43	25½	1½, 1¼ and ¾	28½	11½
1½	48	35½	1½	33½	20½
¾ to 1½	52	39½	¾ to 1½	39½	24½
2 to 3	53	40½			
Lap Weld, extra strong, plain ends		Lap Weld, extra strong, plain ends		Lap Weld, extra strong, plain ends	
2	45	33½	11½	25½	10½
2½ to 4	48	36½	11½	31½	17½
4½ to 6	47	35½	2	33½	20½
7 to 8	43	29½	2½ to 4	35	23½
9 to 12	38	24½	4½ to 6	34½	22½
			7 to 8	26½	14
			9 to 12	21½	9½

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers have been seven (7) points lower (higher price) than carload lots and on butt and lap weld galvanized iron pipe have been nine (9) points lower (higher price).

Boiler Tubes

The following are the prices for carload lots, f.o.b. Pittsburgh:

Lap Welded Steel	Charcoal Iron
3½ to 4½ in. 40½	3½ to 4½ in. -16
2½ to 3½ in. 30½	3 to 3½ in. -1½
2½ in. 24	2½ to 3 in. +1
1½ to 2 in. 19½	2 to 2½ in. +10
	1½ to 1 in. +20

Standard Commercial Seamless—Cold Drawn or Hot Rolled

Per Net Ton	Per Net Ton
1 in. \$327	1½ in. \$207
1½ in. 267	2 to 2½ in. 177
1½ in. 257	2½ to 3 in. 167
1½ in. 207	4 in. 187
	4½ to 5 in. 207

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department, which will be subject to special negotiations.

Sheets

Prices of the Steel Corporation for mill shipments on sheets of United States standard gage in carload and larger lots are as follows, but large premiums are being paid for anything that approaches prompt delivery:

Blue Annealed—Bessemer

	Cents per lb.
No. 8 and heavier	3.50
Nos. 9 and 10 (base)	3.55
Nos. 11 and 12	3.60
Nos. 13 and 14	3.65
Nos. 15 and 16	3.75
Box Annealed, One Pass Cold Rolled—Bessemer	
Nos. 17 to 21	4.15
Nos. 22 to 24	4.20
Nos. 25 and 26	4.25
No. 27	4.30
No. 28 (base)	4.35
No. 29	4.45
No. 30	4.55
Galvanized, Black Sheet Gage—Bessemer	
Nos. 10 and 11	4.70
Nos. 12 to 14	4.80
Nos. 15 and 16	4.95
Nos. 17 to 21	5.10
Nos. 22 to 24	5.25
Nos. 25 and 26	5.40
No. 27	5.55
No. 28 (base)	5.70
No. 29	5.95
No. 30	6.20
Tin-Mill Black Plate—Bessemer	
Nos. 15 and 16	4.15
Nos. 17 to 21	4.20
Nos. 22 to 24	4.25
Nos. 25 to 27	4.30
No. 28 (base)	4.35
No. 29	4.40
No. 30	4.40
Nos. 30½ and 31	4.45

Machinery Markets and News of the Works

PROSPECTS BRIGHT

Good Business for Machine-Tool Trade in Sight.

January Sales in Good Volume, in Some Instances Exceeding Those of December

Sales of machine tools continue in such volume that deliveries are being pushed farther and farther ahead. On top of an excellent current business, new projects are looming up which promise active markets for some time to come. January sales records are fully up to December, which was the best month last year, and in some instances December records are being exceeded.

Advances in prices have taken place on a number of lines. Some makes of planers, boring mills, turret lathes, hand screw machines and milling machines have been advanced amounts varying from 5 to 15 per cent. Selling prices on these tools are now the highest ever known.

The New York market is active, the automotive industries coming to the front with considerable business. In addition to the buying of the H. H. Franklin Mfg. Co., Syracuse, N. Y., mentioned last week, purchases are being made by other automotive manufacturers. The Holmes Mfg. Co., Shelton, Conn., is buying to increase its output of air-cooled motors to 35 a day. Bowen Brothers, Albany, N. Y., will manufacture a four-cylinder engine and equipment for initial operations is being purchased. The Willys Corporation, Elizabeth, N. J., has bought more equipment, both standard and special and a number of cranes. The International Motor Truck Co. is buying for its plants at

New York

NEW YORK, Jan. 27.

Numerous projects which will call for large quantities of machine tools are before the trade and there is everywhere a spirit of optimism that present demand for metal-working machinery will be maintained for some time to come. The automotive industries continue to figure prominently in the expectations of continued good business.

A development of interest in the automobile field is the purchase by the Mercer Automobile Co., Trenton, N. J., of the patterns and right to manufacture the Crane-Simplex automobile, formerly owned by the Wright-Martin Aircraft Corporation, which was recently absorbed by the International Motor Truck Co. This transaction, following the virtual merger of the Mercer Automobile Co. and the Locomobile Co., Bridgeport, Conn., is presumed by the trade to be a forerunner of expansion of the manufacturing activities of all three units of this organization. It has not been announced whether a separate plant will be acquired for the production of the Crane-Simplex car. It is also reported that the Mercer Automobile Co. will place on the market a light, six-cylinder car. A small amount of new equipment is now being purchased for the Mercer plant at Trenton and further buying is expected within the near future.

The International Motor Truck Co. has come into the market for equipment and its ultimate purchases are expected to be quite extensive. The company will divide its manufacturing operations among its three plants at Plainfield, N. J., Allentown, Pa., and New Brunswick, N. J., the latter being the plant acquired from the Wright-Martin Aircraft Corporation. The Plainfield plant will build the engines, the Allentown plant the chassis and the New Brunswick plant

Plainfield and New Brunswick, N. J., and Allentown, Pa. The Mercer Automobile Co. has bought the rights to manufacture the Crane-Simplex car and new equipment will probably be required. The Mercer company is now buying some equipment for its Trenton plant. The Stevens-Duryea Co. is buying for its plant at Chicopee, Mass.

Lists of tools are expected by the trade soon from the C. W. Hunt Co., Staten Island, and the Columbia Graphophone Co., Bridgeport, Conn. The latter will buy entire equipment for its new Baltimore and Canadian factories.

In the Chicago market the Worthington Pump & Machinery Corporation has bought about \$50,000 worth of tools for its Cudahy, Wis., plant. The American Steel Foundries has bought tools for its new automobile wheel department. The International Harvester Co. has been buying almost daily since the first of the year. The Big Four Railroad has issued a list of tools at Chicago.

Automobile and tractor companies continue to buy at Cleveland. The Chandler Motor Car Co. has placed a few orders and the Eaton Axle Co., Cleveland, has bought sufficient equipment for an experimental plant. Tools for production will be purchased later.

The Newport Torpedo Station, Newport, R. I., is inquiring for 100 or more tools at Boston. The General Electric Co. is in the market for a considerable number of tools for its Lynn works. The Boston & Albany Railroad is asking for information on tools and is expected to issue its 1920 list soon.

Members of the French commission, which will select tools from the Government surplus stocks, will arrive in the United States this week.

the transmissions. Equipment is being exchanged between plants to provide for this method of production, and new tools are being required to round out.

The Holmes Mfg. Co., Shelton, Conn., has come into the market for tools to increase its production of air-cooled automobile engines to 35 a day. Bowen Brothers, Albany, N. Y., who were formerly connected with the Rutenber Motor Co., Marion, Ind., are about to engage in the manufacture of a four-cylinder automobile engine and a member of the firm has been in New York the past week placing orders for initial equipment.

The Stevens-Duryea Co., Chicopee, Mass., has been buying tools and the Willys Corporation, Elizabeth, N. J., has placed further orders.

The sale of the five war plants of the Remington Arms Co., Bridgeport, Conn., is expected to result in considerable machine-tool purchasing as two large companies, which have been active buyers in the past few months, are reported to be interested in two of the plants. The equipment in the buildings was used for munitions and will not be suited to the new manufacturing operations which the buildings will house.

The Columbia Graphophone Co., Bridgeport, Conn., will soon issue large lists of tools for the equipment of its new plants at Baltimore, Md., and in Canada. The Crane Co., at Bridgeport, is expanding its department there for the manufacture of plumbing goods and has bought quite a number of small tools.

Two concerns at Bloomfield, N. J., are expected to be active purchasers soon. The Empire Cream Separator Co. has been buying a small amount of equipment, but has plans under way for additions to its plant. The American La

France Engine Co. will also require tools for a new plant at Bloomfield.

The C. W. Hunt Co., Livingston, Staten Island, will issue a list of tools soon to increase output of its products, which include coal handling machinery and industrial trucks.

Among the purchasers of tools in the past week are the Birmingham Iron Foundry, Derby, Conn., which has bought large lathes, planers, etc.; the Providence Fittings Co., Pawtucket, R. I., which has bought new and used screw machines and other tools; McGill & Holford, Binghamton, N. Y., who have purchased a number of used screw machines, and the Reading Valve & Fittings Co., Reading, Pa., a subsidiary of the Reading Castings Co., which has placed orders for screw machines. The E. W. Bliss Co., Brooklyn, has bought used planers and is in the market for other large tools for quick delivery.

The Bureau Technique Francaise, Ltd., Woolworth Building, New York, has recently bought equipment for shipment to Russia. The bureau represents Russian machinery dealers.

The crane market continues active, although most inquiries are for one or two cranes. The locomotive crane business is still heavy. The Dunlop-America Co., Ltd., 19 West Forty-fourth Street, New York, a subsidiary of the British company, has awarded a contract to the Foundation Co., New York, for the erection of a plant near Buffalo. The Foundation Co. will purchase the equipment, which will include the latest material handling machinery. The Cunard Steamship Co., New York, has acquired 3500 ft. of waterfront at Weehawken, N. J., and will erect a terminal estimated to cost \$30,000,000. It will include 8 steel and concrete piers, 1000 ft. long, 150 ft. wide, double-decked and equipped with electric cranes, trucks and other material handling machinery.

Inquiries in the market include the Phoenix Utilities Co., 71 Broadway, New York, in the market for a 20-ton, 30-ft. span overhead traveling crane, for Texas; the Midvale Steel & Ordnance Co., a 2-ton, 18-ft. span, overhead traveling crane; the Remington Salt Co., Ithaca, N. Y., in the market for a crane to handle coal from cars to storage; the Perth Amboy Shipbuilding Co., Perth Amboy, N. J., in the market for overhead traveling cranes.

The Phelps-Dodge Co. has placed its order with Pawling & Harnischfeger. The B. F. Goodrich Co., Akron, Ohio, has purchased two 15-ton overhead traveling cranes and one 15-ton gantry crane from the Whiting Foundry Equipment Co. The Spanish-American Iron Co., Bethlehem, Pa., has purchased a 7½-ton crane trolley from Whiting. The Tide-water Coal & Supply Co., Hackensack, N. J., has closed for an 8-wheel, 15-ton, 50-ft. boom, locomotive crane with the Ohio Crane Co. The Willys Corporation, Elizabeth, N. J., has purchased six 10-ton, 58-ft. span, 3-motor, overhead traveling cranes from the Bedford Foundry & Machine Co. The Wheeler Condenser & Engineering Co., Carteret, N. J., has purchased a 20-ton overhead traveling crane from Niles-Bement-Pond Co. The General Electric Co. has placed an order with the Morgan Engineering Co. for a 50-ton, 58-ft. span, overhead traveling crane for West Lynne, Mass.

The Bird-Archer Co., 90 West Street, New York, recently increased its capital stock from \$200,000 to \$350,000, the additional funds to be used in the enlargement of its plants and the establishment of a high-speed cast-steel plant at Cohoes, N. Y. P. B. Bird is president.

The Tide Water Oil Co., 11 Broadway, New York, is proposing to issue 20 per cent on its present capital stock, amounting to \$6,600,000 increase, in addition to issuing \$2,000,000 to employees.

The General Chemical Co. has entered into a contract with the J. G. White Engineering Corporation, 43 Exchange Place, New York, covering the future designing, engineering and construction work incident to improvements and extensions to existing manufacturing plants, buildings, and other property, and in connection with any new projects or developments which may be undertaken from time to time.

The De Laval Separator Co., Poughkeepsie, has placed a contract with the John W. Ferguson Co., Paterson, N. J., for the immediate erection of a one-story and basement, saw-tooth type power machine building, 150 x 150 ft., having a floor area of 48,000 sq. ft., of brick and steel sash.

John T. Lewis & Brothers Co., Philadelphia, Pa., manufacturer of painters' supplies, subsidiary of the National Lead Co., has awarded the Turner Construction Co., 244 Madison Avenue, New York, contract to erect a one-story furnace house, 121 x 183 ft., to cost \$75,000.

The Portable Machinery Co., Canal Street, Passaic, N. J., manufacturer of portable steel wagon loaders, has awarded a contract to the John J. O'Leary Co., 500 Bloomfield Avenue, Passaic, N. J., for a new one-story plant, 100 x 400 ft., at Clifton, N. J. J. L. Wents is president.

Property of the Chillingworth Mfg. Co., 245 Westside Avenue, Jersey City, N. J., manufacturer of pressed steel

gear cases, will be sold by Francis P. Garvan, Alien Property Custodian, on Feb. 4.

The Lord Construction Co., 105 West Fortieth Street, New York, has effected a consolidation of its marine interests with the Weehawken Dry Dock Co., foot of Baldwin Avenue, Weehawken, N. J., under the name of the Lord Dry Dock Co., capitalized at \$10,000,000. The new drydock plant of the Weehawken company at North Bergen and Guttenberg, recently announced in *The Iron Age*, will be constructed by the consolidated company. It is said that later a 20,000 ton drydock will be constructed. About 10 shop buildings will be constructed, aggregating 125 x 250 ft., and comprising plate, boiler, copper and pipe shops, forge and blacksmith works, a brass foundry and a pattern and carpenter shop. It is planned to have the plant ready for service within eight months. The works are estimated to cost in excess of \$5,000,000. The Lord Construction Co. is now operating a shipbuilding plant at Field's Point, Providence R. I., equipped to make boiler, engine, hull repairs, etc.

The Thatcher Furnace Co., George Street, Newark, N. J., has filed plans for a four-story addition, 51 x 68 ft., to cost \$31,000.

The Newark Leather Machinery Co., 127 New Jersey Railroad Avenue, Newark, N. J., has been incorporated with a capital stock of \$100,000. It recently acquired property, 40 x 112 ft., at Frelinghuysen Avenue and Stanton Street, and will use the site for a one-story plant to cost \$30,000. The incorporators are John A. Metzler, John A. Bernhard and Carl T. Freggens.

The Perfection Tool & Machine Co., 320 Market Street, Newark, N. J., has filed notice of organization. Morris Schwartz, 710 South Tenth Street, heads the company.

The Miniature Incandescent Lamp Co., Newark, N. J., has purchased the building now occupied at Eighth and High streets, comprising a three-story brick structure. For its No. 2 plant, the company has acquired the three-story brick factory of the Vosburgh Miniature Lamp Co., Day Street, near Main Street, Orange, N. J., covering an area 52 x 190 ft. It is planned to install additional machinery at both plants.

The Greater New York Metal Bed Co., 661 Morgan Avenue, Brooklyn, has acquired about two acres at 353-63 Frelinghuysen Avenue, Newark, N. J., for a new plant. The first unit will comprise a one-story building of about 30,000 sq. ft. manufacturing area, estimated to cost with equipment close to \$200,000. It is expected to have the plant ready for occupancy early in May, when it will remove to the new location. A power plant will also be erected.

The American Type Founders' Co., Communipaw Avenue, Jersey City, N. J., is planning for a one-story plant, 200 x 230 ft., near Elmora, N. J.

The American Safety Razor Corporation, 303 Jay Street, Brooklyn, is having plans prepared for reinforced-concrete additions to its plant, including a five-story factory building, 75 x 140 ft., with one-story extension, 25 x 125 ft.; a two-story building, 44 x 65 ft.; and one-story boiler plant, 25 x 50 ft., to be located on Lawrence and Johnson streets. William Higginson, 18 East Forty-first Street, is the architect.

The United States Battery Co., associated with the H. B. Schontz Co., 157 West Fifty-fourth Street, New York, is having plans prepared for a four-story works building, 72 x 100 ft., at 161-7 West Sixty-fourth Street, to cost \$100,000.

The Expanded Metal Safety Guard Co., 605 West Forty-third Street, New York, has leased the plant of the William C. Van Brunt Iron Works, at Fourteenth and Hamilton streets, Long Island City, including about 10,000 sq. ft. of adjoining land, for a new plant.

The Northern Metal Co., 233 Broadway, New York, has filed notice of dissolution.

The Enameling & Stamping Corporation, Webster and Second avenues, Long Island City, New York, has been incorporated in Delaware with a capital stock of \$1,000,000 to manufacture stamped metal goods, utensils, etc.

The Federal Bearing Co., Fairview Street, Poughkeepsie, N. Y., will build a three-story plant.

The City Commission, Jersey City, N. J., is considering the purchase of a site on Bright Street for a municipal machine shop to cost about \$50,000.

The Campbell Stove Co., Rutherford, N. J., has been incorporated with a capital of \$25,000 by William Bell, Colin Campbell and F. W. Conklin, to manufacture boilers, stoves, etc.

The Dry Dock Sheet Metal Works, 10 West Forty-second Street, New York, has filed plans for a one-story building at 509 East Roth Avenue, 25 x 102 ft.

The Motometer Co., 15 Wilbur Avenue, Long Island City, New York, has acquired property, 20 x 100 ft., on Sunswick Avenue, near Wilbur Avenue.

The American Arch Co., New York, has been incorporated with a capital stock of \$50,000 by H. G. Wenzel, Jr., W. A. O'Neill and C. H. Lawson, 237 Flatbush Avenue, Brooklyn, to manufacture railroad equipment.

The Barde Steel Products Corporation, 114 Liberty Street, New York, has filed articles of incorporation with a capital stock of \$1,500,000.

The Marine Repair Corporation, Brooklyn, has been incorporated with a capital of \$100,000 by R. Graff, J. R. Tinkler and J. A. Archung, 5423 Second Avenue, to operate a shipyard.

The Queensboro Tool & Die Co., 136 West Avenue, Long Island City, has purchased property, 50 x 100 ft., on Fifth Avenue, near Washington Avenue, for an addition to its plant.

The E. Behringer Sheet Metal Works, Inc., 315 East Ninety-seventh Street, New York, has increased its capital from \$50,000 to \$125,000. Contract has been awarded to Peter Guthy, 956 Broadway, for a one-story brick plant, 125 x 150 ft., at Flushing and Wyckoff avenues, Brooklyn, to cost \$50,000.

R. A. Stewart & Co., Inc., 201 Broadway, New York, manufacturer of metal stamps, etc., will build a plant at 80 Duane Street, to cost about \$45,000.

The Western Electric Co., 195 Broadway, New York, is having plans prepared by McKenzie, Voorhees & Gmelin, 1123 Broadway, architects, for an eight-story reinforced-concrete building at Hudson and West Houston streets.

Frederick R. Wood & Son, Inc., New York, has been incorporated with a capital stock of \$200,000 by J. C. Konrad, A. Beutler, Jr., and C. W. Wood, 205 West Nineteenth Street, to manufacture automobile parts, bodies, etc.

The Nolan Standard Muffler Co., New York, has been incorporated with a capital stock of \$350,000 by G. B. Brooks, P. B. Barringer, Jr., and P. Huetwohl, 166 Dean Street, to manufacture metal mufflers for automobiles, etc.

Buffalo

BUFFALO, Jan. 26.

The Rome Wire Works, Railroad Street, Rome, N. Y., has acquired property on Kensington Avenue, Buffalo, including factory buildings, for a local works. It proposes to make this its main plant, and will remove its present works, it is said, to the new location.

The Simmons Co., 17 Ellicott Street, Buffalo, manufacturer of brass and iron beds, with headquarters at Kenosha, Wis., will build a two-story addition to its local factory, 81 x 260 ft.

The General Castings Corporation, 577 Tonawanda Street, Buffalo, is developing a capacity of about 20 tons of material a day, including gray-iron, machine and semi-steel castings. In connection with operation, the General Pattern Shop, a subsidiary organization, is also producing at capacity.

The Elbridge Automotive Corporation, Buffalo, manufacturer of marine engines, is planning to extend its operations to include the production of engines for automobiles and motor trucks. Arrangements have been made to equip a local factory for these products.

The Pierce-Brown Co., North Tonawanda, N. Y., has been incorporated with a capital stock of \$350,000 by W. B. Pierce, S. W. Brown and T. J. Wilson, to manufacture castings and machinery.

The Williams Tool Corporation, Erie, Pa., recently organized to take over the plant and business of the Williams Tool Co., manufacturer of pipe-threading machinery, proposes to double the output of the works by the installation of equipment.

The Globe Malleable Iron & Steel Co., 101 Greenway Avenue, Syracuse, N. Y., plans a one-story addition to cost over \$100,000.

The Morley Machinery Corporation, Rochester, N. Y., has been incorporated with a capital stock of \$50,000 by G. C. and C. F. Morley and J. S. Armstrong.

Pumping machinery, tankage apparatus and electric equipment will be installed in the new garbage disposal plant to be constructed by the Board of Contract and Supply, Rochester, N. Y., at an estimated cost of \$650,000. Plans have been prepared.

The Rochester Gas & Electric Corporation, Rochester, N. Y., is planning the installation of new steam-driven electric generating machinery and auxiliary equipment to increase present capacity.

The J. E. Fell Machine & Foundry Co., Ogdensburg, N. Y., has been incorporated with a capital stock of \$20,000 by W. J. Dunn, C. T. and J. E. Fell.

The Brown-Lipe-Chapin Co., 110 Seneca Street, Syracuse,

N. Y., manufacturer of gears, transmissions, etc., is completing plans for a six-story addition, 70 x 300 ft., on West Fayette Street, to cost \$300,000.

The City Council, Buffalo, N. Y., is considering plans for a municipal hydroelectric plant. A charter amendment providing for it is now being prepared.

The Acme Pattern & Machine Co., 1553 Niagara Street, Buffalo, is having plans prepared for a one-story assembling department, 50 x 120 ft., estimated to cost \$25,000.

Philadelphia

PHILADELPHIA, Jan. 27.

Philadelphia machinery dealers continue to do a very good business, January sales records in some cases have equalled or exceeded those of December, which was the best month in 1919. Delaware River shipbuilders are taking more interest in new equipment that will cut down production costs. During the period when the shipyards were operating under Government supervision their chief aim was to get production without regard for costs, but under private operation it is important that they make all of the short cuts possible toward lowest production costs as shipbuilding contracts are now being let on a price competitive basis. Therefore, some of the shipyards are throwing out antiquated or worn-out equipment in favor of machines that will cut labor costs. The Sun Shipbuilding Co., Chester, Pa., which has a considerable amount of work on hand, is buying some new tools and has issued a list of 20 to 30 machines for repair shops on ships it is building. The list calls principally for lathes, shapers, drills and grinders.

The Westinghouse Electric & Mfg. Co., Essington, Pa., has not yet taken action on a small list of tools which was sent out about two weeks ago. As soon as it is decided what machinery will be moved from East Pittsburgh to the Essington plant this company will be in the market for other tools. A part of the equipment at the East Pittsburgh plant, consisting mainly of large tools, will be offered for sale.

The Philadelphia Textile Machinery Co., Sixth Street and Tabor Road, Philadelphia, manufacturer of drying machinery, etc., has filed plans for a one-story reinforced-concrete addition, 100 x 240 ft., to cost \$72,000.

The Bigelow-Wiley Motor Co., 304 North Broad Street, Philadelphia, has awarded a contract to John N. Gill & Co., Otis Building, for a ten-story reinforced-concrete service and repair works, 95 x 120 ft., at Broad and Vine streets, to cost \$550,000.

The Philadelphia Rubber Works Co., Thirty-seventh and Reed streets, Philadelphia, has acquired property, aggregating about 97 acres in the Kirkover tract, River Road, Buffalo, N. Y., and plans a new plant on a portion of the site. The first unit plan will be started at an early date. The works will be equipped for rubber reclaiming and general production.

The Ruboil Belting Co., Eighth and Wallace streets, Philadelphia, has leased property at 41 North Tenth Street, for a new establishment.

The Philadelphia Iron Works, Eighteenth and Shamokin streets, Philadelphia, bankrupt, has disposed of its plant, 72 x 268 ft., at a public sale.

John E. Poorman, 1825 Bristol Street, Philadelphia, manufacturer of machinery and parts, has acquired property at 1820-28 Bristol Street, 76 x 114 ft., as a site for a machine shop.

Fire, Jan. 14, destroyed a portion of the works of the James H. Billington Co., North Randolph Street, Philadelphia, mill supplies.

The Enterprise Mfg. Co., Third and Dauphin streets, Philadelphia, manufacturer of hardware products, has filed plans for a three-story brick addition, 115 x 164 ft., to cost \$150,000.

The Accessories Mfg. Co., 263 North Fifteenth Street, Philadelphia, has leased a portion of the building at 1504 Vine Street, for a new establishment.

The Quaker City Motor Parts Co., Tioga and Richmond streets, Philadelphia, has filed plans for a one- and two-story addition, 27 x 122 ft., and 46 x 58 ft., to cost about \$25,000.

Fire, Jan. 14, destroyed the machine and automobile repair shop of Francis Kunkle, Slatington, Pa., with loss estimated at about \$15,000.

The knife department of the Case Cutlery Co., Bradford, Pa., was damaged by fire, Jan. 20, with loss of about \$40,000.

The Lycoming Foundry & Machine Co., Williamsport, Pa., will build a plant addition, and make alterations in its machine shop and foundry to cost about \$150,000.

Fire, Jan. 20, destroyed the main building at the plant of the General Refractories Co., Lock Haven, Pa., with loss estimated at \$75,000.



SALES STAFF OF THE HESS STEEL CORPORATION, BALTIMORE

N. A. Hodge	R. S. Cox	C. R. Bulley	R. W. Bristol	E. L. Malone	E. P. Laning	F. D. Rice
		Sales Metallurgist				
	T. A. Canty	A. V. Farr	Henry Hess	H. L. Hess		
		Sales Manager	President	Vice-president		

The Harrisburg Mfg. & Boiler Co., Harrisburg, Pa., is reported to have made arrangements with the Hurlburt Motors, Inc., 2413 Third Avenue, New York, maker of heavy-duty motor trucks, whereby the facilities of the Harrisburg plant have been rendered available for the manufacture of Hurlburt trucks. During the war the Harrisburg works turned out gun carriages and railroad car mounts for heavy artillery.

New England

BOSTON, Jan. 26.

The machine-tool market is more active with indications that January sales will equal or exceed those for December. Prospective buying is on a broad scale. The Boston & Albany Railroad is working on its 1920 budget and asking information on tools, but other New England roads are not making provisions for shops. Deliveries are still extended, but some improvement is noted. Some makes of planers have been materially advanced the past few days.

The General Electric Co., Lynn, is in the market for automatic screw machines, bench and larger lathes, shapers, drill presses, drilling machines, power hack saws, tool grinders, universal grinders and other tools. The Worthington Pump & Machinery Corporation has a number of inquiries out against its 1920 budget, but released no orders the past week. The Newport Torpedo Station, Newport, R. I., is in the market for about 100 tools, many of heavy automatic type for use in connection with torpedo castings. The Fess Rotary Oil Burner, Inc., Boston, is buying considerable machine shop equipment. The Revere Rubber Co., Providence, R. I., wants a universal grinder. A large number of air chucks have recently been sold in the Springfield, Mass., district. The Stroms Drop Forging Co., East Springfield, Mass., has practically completed its purchases of shop and foundry equipment. The Greenfield Tap & Die Corporation, Greenfield, Mass., recently bought an air operated arbor press, and D. Goff & Sons, Providence, a large lathe. The Gillespie Mfg. Co., Lowell, Mass., has bought eight drilling machines, and the State of Vermont a lathe, drill and other garage equipment.

The crane market, while not active, shows more life. The General Electric Co., Lynn, purchased a Morgan crane, and a Vermont stone works is about to close for two 2-ton cranes and two of 25-ton capacity.

Government owned machine tools stored at Bridgeport and Springfield have been pressed for sale the past fortnight. A Boston second-hand dealer bought in the neighborhood of 200 profilers stored at Springfield at \$75 each. The Napier Saw Works, Springfield, bought between \$40,000 and \$50,000 worth of tools stored there and at Bridgeport. Many of these were never used and sold for a few hundred dollars each. The Boston Gear Works, Norfolk Downs, Quincy, Mass., purchased a four-spindle automatic screw machine, small production lathes and other automatic gear-making tools. The Greenfield Tap & Die Corporation, Greenfield, Mass., bought a Pratt & Whitney automatic and a Briggs high duty miller.

The Leslie Leeds Co., Bridgeport, capitalized for \$600,000, will manufacture safety razors under a Connecticut charter. It has opened an office in the Watson Building, Bridgeport, and has secured temporary manufacturing quarters on the top floor of the Bridgeport Engineering Co.'s plant. H. Al-

bert Phillips and James W. Leslie, Bridgeport, and M. K. Sorenson, Fairfield, Conn., are back of the project.

Edward O. Oefinger, who recently purchased the Ayer-O'Connell Mfg. Co.'s plant, Meriden, Conn., also has bought the Meriden Knife Co.'s factory. Both establishments will be devoted to the manufacture of parts of cutlery used by the Miller Brothers Cutlery Co.

The Martin Machine Co., Montague, Mass., has decided not to go ahead at present with its plans for a one-story machine shop. Frank J. Martin is president and treasurer.

Bids are being received for the steel work on a press shop to be erected by the Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. It will be one-story, 107x237 ft.

Plans for a two-story carpenter shop, 60x240 ft., to be erected by the Whitins Machine Works, Whitinsville, Mass., will be ready for bids within the next few days.

The Auto Metal Body Co., Springfield, Mass., contemplates making some alterations at its plant for the manufacture of bodies. It recently purchased the Stoddard Service station.

Contractors are figuring on an addition to the Charlestown, Boston, Navy Yard foundry and some alterations in the machine shop, the estimated cost of which is \$150,000.

The William H. Haskell Mfg. Co., Pawtucket, R. I., which recently placed orders for equipment in this market, has awarded a contract for a two-story, 85x150 ft., machine shop.

The General Electric Co., Lynn, Mass., is building a three-story addition, 100x60 ft., to one of its plants, and is figuring on similar construction work on its plant at Windsor, Conn.

Plans are being drawn for a \$200,000 factory for the Imperial Knife Co., Providence, R. I.

Contracts have been signed for the erection of a four-story, \$150,000 structure for the Davis & Furber Machine Co., North Andover, Mass., to be completed by June 15.

The Baker-Vawter Co., Holyoke, Mass., loose leaf systems and steel filing equipment, will enlarge its output by the installation of production machinery. It is building new factories in Kansas City and at San Francisco.

The Gilbert & Barker Mfg. Co., Springfield, Mass., will begin operations at once to double the size of its plant, expending about \$1,000,000. C. C. Ramsdall is the vice president.

The Baker, Rauch & Lang Co., Cleveland, Ohio, manufacturer of electric-operated automobiles, has plans under way for the construction of a new branch plant on property recently acquired at Willimansett, Mass. The initial unit will be one-story, brick and steel, about 300 ft. long.

The H. B. Ives Co., New Haven, Conn., manufacturer of builders' hardware, has increased its capital from \$100,000 to \$300,000.

The Crescent Die Co., 292 Eddy Street, Providence, R. I., has been organized to manufacture tools, dies, etc. Henry W. Dahl, 1216 Broad Street, heads the company.

The Cheney Bigelow Wire Works, Springfield, Mass., has taken bids for the erection of a two-story, brick addition, 71x195 ft. and 48x271 ft. A. J. Tucker is architect.

The Century Machine Co., Holyoke, Mass., has awarded a contract to the Casper Ranger Construction Co., Holyoke,

for two additions, comprising a two-story building, 42x90 ft., and one-story and basement structure, 150x150 ft.

The Arthur Balfour Steel Co., Dorchester, Mass., has been incorporated in Delaware, with capital of \$60,000 by George F. Williams, Dorchester; Edward E. Gordon, West Medway, Mass.; and William A. Bradbury, Montreal, Can., to manufacture iron and steel products.

The United States Bobbin & Shuttle Co., Providence, R. I., has been incorporated with a capital of \$1,500,000 by Luther C. Baldwin, Frederic C. Church and George H. Wilson, to manufacture textile machine equipment.

Baltimore

BALTIMORE, Jan. 26.

In connection with the plans of the Locke Insulator Co. to establish a plant in Baltimore, it has been announced that control of the company has been acquired by Symington, Hoffman & Co., of which Donald Symington is a member. Plans are being made to construct a plant which will cost between \$1,000,000 and \$1,500,000. It will employ about 700 workers. The company has a large plant at Victor, N. Y.

The C. D. Pruden Co., manufacturer of portable steel buildings, Bayard and Warner streets, Baltimore, and the Blaw-Knox Co., Pittsburgh, are reported to have agreed upon a plan for co-operation in the manufacture of portable steel buildings, and hollow metal windows and doors. Plans are being made to enlarge the plant in Baltimore. Clarence D. Pruden is president of the Baltimore company.

The Sanitary Bottle Cap & Seal Co., 703 Hillen Street, Baltimore, has been incorporated with \$100,000 capital stock to manufacture bottle caps, seals, etc. The incorporators are Paul J., Paul A. and Alphonse J. Hentschel.

The Hunter Heater Co., St. Paul and Twenty-sixth streets, Baltimore, has been incorporated with \$100,000 capital stock by John D. Hunter, William E. Bonn and George L. Henck to manufacture heating apparatus.

The Reus Brothers Co., 146-150 West Mount Royal Avenue, machinist, has awarded a contract to the consolidated Engineering Co., Calvert Building, Baltimore, for a plant 75 x 250 ft., for the manufacture of piston rings, etc., to cost about \$75,000. Burkhard J. Reus is president and manager.

The McNamara Brothers Co., Westport, Baltimore, manufacturer of boilers and tanks, plans to erect an addition 80 x 200 ft.

The Sistersville Tank & Boiler Works, Sistersville, W. Va., plans to build a factory, 95 x 150 ft.

I. Kuilecki Sons, Bainbridge, Ga., will build a machine shop, 30 x 80 ft., to cost about \$10,000.

The Crown Cork & Seal Co., 1511 Guilford Avenue, Baltimore, has preliminary plans under way for a four-story plant addition on Latrobe Street. Otto G. Simonson, Maryland Casualty Building, is the architect.

Lyon, Conklin & Co., 19 Balderston Avenue, Baltimore, manufacturers of sheet-metal specialties, are planning for a plant addition. The company recently increased its capital from \$50,000 to \$500,000.

The General Mfg. Co., Wilmington, Del., recently incorporated with a capital of \$10,500,000 to manufacture metal products, has taken over the plant of the Artillery Fuse & Standard Arms Mfg. Co., South Wilmington. Alterations will be made to suit the new line of manufacture, and it is proposed to inaugurate operations early in March. Col. Weller E. Stover, William H. Fenn and William S. Hilles, formerly connected with the Artillery Fuse company, head the new organization.

The Vasil Steam System Co., Washington Loan & Trust Building, Washington, D. C., has had plans prepared for a one-story machine shop and foundry.

Equipment to cost about \$200,000 will be installed in the new creosoting plant to be established at Port Wentworth, Ga., by the Savannah Creosoting Co., Savannah, Ga., recently organized. The plant will be equipped primarily to handle railroad ties, with daily capacity of about 100,000 ft. board measure. F. S. Bishop is manager.

The Burnett Boiler Works, Thomasville, Ga., is planning a new plant at Gadsden, Ala., to cost about \$15,000, exclusive of machinery.

The Crane Co., Bessemer, Ala., manufacturer of valves, pipe fittings, etc., is planning for a new local foundry to cost about \$30,000. W. H. Kettig is manager.

The Pulaski Foundry & Mfg. Co., Pulaski, Va., has increased its capital from \$50,000 to \$150,000. It has preliminary plans under way to approximately double the capacity.

Pittsburgh

PITTSBURGH, Jan. 26.

The Pittsburgh Aeroplane & Motor Co., Kohler Building, Pittsburgh, has plans under way for an aeroplane motors and parts manufacturing plant at Meadville, Pa., to cost over \$1,000,000. Charles L. Sanford is president.

The Cambria Steel Co., Johnstown, Pa., is planning for two new central power plants to cost about \$2,000,000, including machinery, one at the Franklin works to have a capacity of about 8000 hp., the second with output of about 4000 hp. at Johnstown. The company has perfected plans for a plant for the construction of tank cars at its Franklin works, to cost in excess of \$1,500,000.

The Wolf Summit Coal Co., Wolf Summit, W. Va., is planning for the installation of electrical equipment at its properties, to increase its output to 3000 tons per day. It recently increased its capital from \$350,000 to \$750,000.

The foundry of the American Brake Shoe & Foundry Co., Uniontown, Pa., has been placed on the market. The plant aggregates about 23,400 sq. ft., with auxiliary buildings.

Barton R. Shover, Oliver Building, Pittsburgh, architect and engineer, has plans under way for a steel plant for the Electric Alloy Steel Co., Youngstown, Ohio, to be located near that city. The plant, with equipment, is estimated to cost close to \$1,000,000.

The new plant of the Paragon Motor Car Co., Connellsville, Pa., will comprise a one-story and two-story building, 400 x 540 ft., and 60 x 400 ft., respectively. Plans are now being prepared, and it is proposed to inaugurate construction early in the spring. The plant, with machinery and equipment, will cost about \$1,000,000, instead of \$1,500,000 as previously announced. The company was incorporated recently with a capital of \$3,000,000. J. Fred Kurtz is president, and T. F. Hockerthal is chief engineer in charge of design and construction.

The American Armature & Engineering Co., Bluefield, W. Va., recently incorporated, is having plans prepared by Pedigo & Cary, Bluefield, architects, for a one-story armature plant, 40 x 100 ft., at Mullins, W. Va.

The Pennsylvania Steel Co., Pittsburgh, capitalized at \$100,000, has been chartered to manufacture iron and steel and their products. The incorporators are W. S. Doty, 25 North Harrison Street, Bellevue, Pa., treasurer; Pressley B. Klein, 405 Pitts Street, Wilkensburg, Pa., and Robert F. Barnett, 828 Ridge Avenue, Pittsburgh.

The Connell-Erben Body Corporation, Clarks Summit, Pa., capitalized at \$50,000, has been formed to manufacture molds, models and automobile bodies. E. B. Morse, Clarks Summit, Pa.; Edgar W. Connell and Lewis Erben, Scranton, are the incorporators.

Cleveland

CLEVELAND, Jan. 26.

Local machinery houses report a good volume of orders, some for a half dozen machines, but no round lot inquiries or orders developed the past week. The automobile field continues the principal source of activity, but tractor companies are buying some machinery and there is a moderate amount of business from other industries. The Chandler Motor Car Co., Cleveland, purchased a number of machines the past week and the Eaton Axle Co. placed orders for equipment for an experimental plant, but has not issued a list of requirements for its new factory. Some attractive business is developing in the Detroit field. The demand for turret lathes and screw machines in small lots continues active.

The Mirroscope Co. and the Balling Tie Buckle Co., which is located in the Mirroscope plant, will be merged under the name of the United Stamping & Machine Co., which has been incorporated with a capital stock of \$267,000. The Mirroscope Co. has been engaged in the manufacture of automobile parts and the new company will manufacture these parts more extensively and make heavier stampings than have so far been produced. The plant will be enlarged and considerable new equipment will be added. George W. Furth, who has been at the head of the two companies, will be president of the United Stamping & Machine Co. Directors include Marion Powell, Frank A. Herman, J. Horace Jones and D. R. Wilkin.

Cleveland machinery dealers have an inquiry from the F. C. Harper Screw Works, 29 South Clinton Street, Chicago, for double stroke cold bolt heading machines with capacity of $\frac{3}{8}$ in. up, bolt head trimmers, automatic screw machines, drilling, screw slotting, thread rolling, pin hole drilling machines and screw routing machines.

The Jenkins Machine Co., Sheboygan, Wis., is inquiring in this market for a 36-in. horizontal boring mill, vertical

gear shaper, screw machine, single spindle high-speed drilling machine, 18 in. x 8 ft. tool room lathe, both with single pulley drive; 3 ft. plain radial drill and a three-spindle high-speed drill with power feed.

The Halladay Motors Corporation, Newark, Ohio, has placed contract with the Austin Co., Cleveland, for a new plant, including an assembling building, 60 x 400 ft., a parts building 60 x 300 ft., stock room 60 x 60 ft., office building, etc. The estimated cost is \$175,000.

The Moore Tool & Machine Co., Newark, Ohio, will erect a one-story plant, 117 x 170 ft.

The Timken-Detroit Axle Co. is planning an extension to its malleable iron foundry in Canton, Ohio, doubling the present capacity of the plant and involving an expenditure of approximately \$500,000.

The Steel Basket Co., Cedar Rapids, Iowa, has acquired the plant formerly occupied by the Standard Stamping Co., Marysville, Ohio, which it will shortly occupy.

The Minerva Foundry & Machine Co., Minerva, Ohio, has under consideration an extension to its plant.

The Forest City Machine & Forge Co., Cleveland, is planning a one-story machine shop addition, 73 x 96 ft.

The American Implement Co., Elyria, Ohio, is planning the erection of a new plant for the manufacture of small tractors. It recently increased its capital stock from \$300,000 to \$2,000,000.

The Franklin Tractor Co. has moved its offices from Franklin, Ohio, to Greenville, Ohio, where it will erect a one-story factory, 100 x 200 ft.

The Collier Truck Co., Bellevue, Ohio, has acquired the building of the Pipe & Foundry Co. in that city which it is remodeling and extending for manufacturing purposes.

The Burger Iron Co., engineer and fabricator of steel construction, Akron, Ohio, has increased its capital stock by \$500,000, but is issuing at present only \$125,000 of this to present stockholders, largely to take care of increased volume of business and for machinery already purchased.

The Garford Motor Truck Co., with factories at Lima, Ohio, announces that the capital stock of the company has been increased from \$5,000,000 to \$10,000,000 to provide for expansion by 100 per cent within the next year or so to meet increased demand. Detailed plans are not as yet complete, but one of the first steps will be to erect a factory addition, 100 x 400 ft., to be devoted entirely to assembling of motor trucks by the installation of latest type of machinery and the adaptation of special assembling methods. To provide for still further expansion it has purchased additional property adjoining its factory.

Chicago

CHICAGO, Jan. 26.

With further advances following those mentioned in this column a week ago, it seems probable that prices generally will move to a higher level. Another important line of planning machines has gone up 10 per cent; two makes of turret lathes and hand screw machines have advanced 5 and 10 per cent respectively; two lines of milling machines have been marked up 10 and 14 per cent each; two makes of boring mills have advanced 10 per cent, and one manufacturer of shapers has withdrawn quotations.

Despite the upward trend of prices and delayed deliveries, business continues to develop in good volume. Stocks on dealers' floors have been reduced to a minimum and back orders are steadily increasing in number, indicating that machine tool production is not keeping up with sales.

The Worthington Pump & Machinery Co., Cudahy, Wis., which recently revived its list issued last summer, has so far purchased to the extent of about \$50,000. The American Steel Foundries has bought equipment for its new automobile wheel department, purchases including two hand screw machines, one broaching machine, one punch press, two high speed ball bearing drills, small grinding machine and a high speed riveting hammer. The Crane Co., Chicago, has ordered two manufacturing milling machines, one open-side 30-in. x 30-in. x 12-ft. planing machine, an upright drill and considerable other equipment for its new valve department. The Miehle Printing Press & Mfg. Co., Fourteenth and Robey streets, Chicago, is in the market for a 96-in. x 72-in. x 25-ft. planing machine, a 42-in. x 42-in. x 10 ft. planer, and a 5-ft. radial drill. The International Harvester Co. has been making purchases almost daily since the first of the year. The Monaghan Machine Co., 2036 Carroll Street, Chicago, will build a large extension for which it will require additional tools. The Gulbransen-Dickinson Co., manufacturer of player pianos, 3232 West Chicago Avenue, Chicago, which is completing a new plant, is about to place its machine-tool requirements.

No railroad purchases have yet resulted from the two

inquiries mentioned a week ago, but a new list has appeared, issued by the Cleveland, Cincinnati, Chicago & St. Louis Railroad (Big Four), covering requirements for its Beach Grove, Ind., shops.

The American Car & Foundry Co. has purchased the works of the Armstrong Paint & Varnish Co., in Paulina Street near the Chicago River, Chicago. The property, 240x300 ft., with other land, will be the site of new works which will cost from \$1,500,000 to \$2,000,000.

The Cinch Fastener Corporation, 1422 Bryan Place, Chicago, has purchased a two-story factory, 65x125 ft., at the southwest corner of Van Buren and Claremont streets. It manufactures automobile curtain fasteners.

A. S. Alschuler, architect, 28 East Jackson Boulevard, Chicago, has received bids on a three-story automobile salesroom and service station, 100x390 ft., for the Chicago Marmon Co., and a three-story structure of the same size for the Hudson Motor Co. of Illinois, to be erected at 2220 to 2238 South Michigan Avenue. The total cost is \$600,000.

G. M. Posner & Co., 327 South La Salle Street, Chicago, will receive bids on a one-story machine shop, 125x125 ft., in Wolfram Street, near North Western Avenue, to cost \$50,000. It will be equipped with a traveling crane.

Lindstrom, Smith & Co., manufacturers of electric vibrators and specialties, 1104 South Wabash Avenue, Chicago, has awarded a contract for the construction of a one-story factory, 130x250 ft., on the north side of Lake Street, 111 ft. west of North Kedzie Avenue, at an estimated cost of \$125,000.

The Chicago Solder Co., 208 North Union Avenue, Chicago, is asking for bids through an architect on the erection of a one and two-story factory, 50x250 ft., at 4201 Wrightwood Avenue. It will cost \$45,000.

The Indiana Motor Truck Co., care of the architect, William P. Whitney, 122 South Michigan Avenue, Chicago, will construct a brick repair shop and garage, 100x190 ft., at 840 South Michigan Avenue, to cost \$45,000.

The Chicago Malleable Castings Co., 1254 West 120th Street, Chicago, has awarded a contract for the construction of a \$50,000 addition.

The Iowa Machine Works, Clinton, Iowa, will soon commence the construction of a foundry, 140x160 ft., and will later erect a machine shop and office building on a site, 250x380 ft., on Fifth Street between Twelfth and Thirteenth avenues.

The Western Iron & Foundry Co., Wichita, Kan., contemplates replacing its foundry with a modern structure to cost \$100,000.

J. P. Kalman & Co., 29 South La Salle Street, Chicago, manufacturer of railroad equipment and supplies, will build a one-story addition, 164x175 ft., at Clearing, near Chicago, to cost \$45,000.

Fire, Jan. 17, destroyed a portion of the works of the Illinois Car & Mfg. Co., Chicago, with a loss of about \$75,000.

The machine shop of the Lehon Co., 4411 Oakley Avenue, Chicago, manufacturer of roofing specialties, was destroyed by fire, Jan. 9, with loss reported at \$50,000.

The new plant to be erected by the Rock Island Register Co., Rock Island, Ill., will comprise a three-story building, 73x115 ft., at Twenty-fifth Street and Fifth Avenue, to cost \$75,000.

The Superior Oven Co., Chicago, associated with L. B. Beardslee & Co., 38 South Dearborn Street, Chicago, has acquired property aggregating about 50,000 sq. ft., at Sixty-sixth Street and Fifty-seventh Avenue, for a new plant.

The Mt. Vernon Car Mfg. Co., Mount Vernon, Ill., is having plans prepared by the Neeler Rich Engineering Co., 431 South Dearborn Street, Chicago, for a one-story plant, 132x558 ft., to cost about \$250,000, including equipment.

Cincinnati

CINCINNATI, Jan. 26.

Machine-tool builders continue very busy and while no large orders have been booked the past week, buying for one and two machines continues in steady volume. Most plants in this district are running behind on deliveries, manufacturers of boring mills particularly being sold well ahead. Automotive companies continue to be the chief buyers, although inquiries are being received from all parts of the country. Dealers in second-hand tools report business booming, the Ordnance Salvage Board disposing of over \$100,000 worth the past week. The University of Cincinnati, East High School and the local Y. M. C. A. are purchasing tools from the Government under the Caldwell law, to be used in vocational training classes. The announcement made last week that a large order for tools had been placed by Spanish and Portuguese interests appears now to have been a

little premature, as certain arrangements have yet to be completed before the deal is closed.

The Cincinnati Engineering Tool Co., Cincinnati, has been organized with a capital stock of \$100,000 to manufacture jigs, dies, etc. It has secured the plant of the Century Tool Co., at Winton Place, and will soon be ready for operation. W. H. Vockell is president of the new company.

The Production Machine Tool Co., Cincinnati, has been organized to manufacture machine tools and has secured premises at 629 East Pearl Street, where it has begun operations. For the present it will build radial drilling machines under contract from one large manufacturer. Later it will branch out into other lines. The company is in the market for a used 4 to 5 ft. radial drill and one 24 in. double head planer, 16 to 20 ft. long. E. R. Grossman is president.

The Jarecki Chemical Co., St. Bernard, a Cincinnati suburb, has let contract to the Austin Co., Cleveland, for the construction of a new section to its plant, to cost approximately \$500,000. It will be 150 x 500 ft., two stories, each story 60 ft. between floor and ceiling. When completed it will be used for the manufacture of fertilizer.

Damage estimated at \$10,000 was caused by a fire in the plant of the Smith Scale Co., Columbus, Ohio, recently. It is understood that a four-story building on Gay Street has been secured where operations will be continued.

The Witt Cornice Co., Winchell Street, Cincinnati, manufacturer of corrugated metal products, has completed plans for a one-story addition, 40 x 100 ft.

The Zimmerman Boiler & Tank Works, Irwin Avenue, Dayton, Ohio, is planning for the erection of a one-story addition.

The Mullens Body Co., Salem, Ohio, manufacturer of automobile bodies, has completed plans for the erection of a new plant, to cost about \$500,000, including equipment.

The Moore Tool & Machine Co., Newark, Ohio, recently organized, is having plans prepared for its proposed new works, 115 x 170 ft., one story, on Williams Street, fronting on the Baltimore & Ohio Railroad, to cost about \$100,000. Otto N. Moore is president and general manager.

Indianapolis

INDIANAPOLIS, Jan. 26.

The Reedy Elevator Co., Indianapolis, with \$90,000 capital stock, is the outcome of the merger of the Indianapolis Elevator & Repair Co. and the D. V. Reedy Elevator Co. A site has been purchased for a factory on South New Jersey Street, between Merrill and South streets, which will have a capacity of 150 to 200 elevators a year. The officers of the new company are D. V. Reedy, president; Glenn Cruzan, secretary-treasurer, and Edward Large and John P. Nohl, vice-presidents.

The Zenite Metal Co., 201 North West Street, Indianapolis, will erect an additional factory, one story, 200 x 420 ft. It manufactures windshields and other automobile parts.

The Automotive Parts Co., 1509-1511 Bates Street, Indianapolis, will build an addition, 100 x 200 ft., to cost \$50,000. The building will be extended another 200 feet as soon as the present unit is completed. The company manufactures fans for automobile trucks and tractors.

The Ames Shovel & Tool Co., Boston, has bought a site for a handle factory at New Albany, Ind. It will give employment to 100 men.

J. J. Morris, superintendent of the Bucyrus Steam Shovel Co., Evansville, Ind., has been elected president of the Evansville Manufacturers' Association.

The E. A. Couturier Band Instrument Co., Laporte, Ind., has been incorporated with \$500,000 capital stock to manufacture band instruments. The directors are E. A. Couturier, E. G. Greenman and O. L. Sutherland.

The Horton Mfg. Co., Fort Wayne, Ind., manufacturer of clothes washing machinery, agricultural machinery, etc., has had plans prepared for two one- and two-story plants, 72 x 225 ft., and 80 x 240 ft., with extension. J. C. Peters is president.

The United States Automotive Corporation, Connersville, Ind., has been organized with a capital of \$10,000,000 to merge and act as a holding company for the Connersville Foundry Corporation, the Lexington Motor Co., Ansted Engineering Co., and the Tector-Hartley Motor Corporation. It plans to manufacture a complete line of motor vehicles and parts. Frank B. Ansted is president.

The Knife & Bar Co., Anderson, Ind., will build two one-story additions, 30 x 70 ft., and 20 x 20 ft.

The City Council, Decatur, Ind., is having plans prepared for a one-story power plant, 82 x 92 ft., to cost about \$150,000, including equipment. D. MacNaughton, Lincoln Life Building, Fort Wayne, is the engineer.

The Railway Motor Car Co. of America, Hammond, Ind., will build a power plant, 40 x 70 ft., and a machine shop, 100 x 250 ft.

Fire entirely destroyed the engine room and partially destroyed the steel shops of the Illinois Car & Mfg. Co., Hammond, Ind., on Jan. 13. The loss aggregated \$150,000.

The Lomar Armored Tire Co., recently incorporated, which will manufacture a pneumatic steel cord tire for automobiles and trucks, has purchased 20 acres at Twenty-sixth and East Walnut streets, Newcastle, Ind., as a site for a plant. Walter Miller will be superintendent and Charles W. Mouch, general manager.

Detroit

DETROIT, Jan. 26.

The Federal Drop Forge Co., Lansing, Mich., recently incorporated with \$400,000 capital stock, has let contract for the construction of a plant, consisting of a hammer shop, 60 x 120 ft.; a building, 60 x 140 ft., for the die, trimming and inspection departments, and other structures for storage, boiler room, etc.

The Buick Motor Co., Flint, Mich., will build additions to its plant in that city to cost approximately \$7,500,000. An additional \$3,000,000 will be expended in building an assembling plant at St. Louis.

The Kol-Ben Wheel Co., manufacturer of wire automobile wheels, Cadillac, Mich., has called a special meeting of stockholders for January 28, to consider an increase in capital stock from \$200,000 to \$500,000.

The Timken-Detroit Axle Co., 136 Clark Street, Detroit, is taking bids for the erection of a one-story shop addition, 60 x 170 ft., at its plant, McKinstry and Fort streets.

The Novo Engine Co., Lansing, Mich., has awarded a contract to H. G. Christman, South Bend, Ind., for the erection of two additions to its plant.

The J. G. Green Foundry Co., Vassar, Mich., will build a one-story foundry, 60 x 160 ft., to cost about \$30,000.

The Thorn Heat Treating Co., Detroit, has been acquired by the United States High Speed Steel & Tool Co. The new owner will continue the operation of the works.

The Automobile Crankshaft Co., 192 Piquette Avenue, Detroit, is taking bids for a one-story addition, 40 x 165 ft. C. M. Kaess is president.

The Briscoe Motor Corporation, Jackson, Mich., has acquired the plant and business of the John Bohnet Co., Lansing, manufacturer of automobile bodies.

The Hill-Curtis Co., maker of saw-mill and woodcutting machinery, Kalamazoo, Mich., is in the market for a structural steel building, 70 to 80 ft. in width, by 160 to 200 ft. long, to be divided in three bays about equally spaced, the center one to carry about a 5-ton electric traveling crane. Saw-tooth or monitor type roof for machine shop with 13 to 14 ft. head-room in side bays and 15 ft. to top of crane rail in center bay.

Milwaukee

MILWAUKEE, Jan. 26.

The machine tool trade continues active and the volume of business is steadily increasing. Milling machine manufacturers are particularly pressed with orders, the principal source of which are the automotive industries. Considerable difficulty is experienced in making prompt deliveries, which has been accentuated by midwinter weather conditions. Traffic to the East is subject to much delay by embargoes.

The expansion of steel casting, as well as gray iron and malleable foundry business in this district is notable. Some of the most important projects in years are developing.

The American Foundry Co., Milwaukee, is in process of organization. The capital stock is to be \$100,000 and the purpose to build and operate a gray iron foundry which will specialize in automotive castings. A site has been acquired on Park Street, near Ninth Avenue. The identity of the promoters is not divulged for the present.

The Wisconsin Aluminum Foundry Co., Manitowoc, Wis., has increased its capital stock from \$100,000 to \$200,000 and has undergone a reorganization, Bruno Dalwig becoming the principal stockholder. The shop at Sixteenth and Franklin streets will be enlarged in the spring, but details are not yet available.

The F. Rosenberg Elevator Co., 170-174 Reed Street, Milwaukee, manufacturer of electric and hydraulic freight

and passenger elevators, has incorporated under the old name, with a capital stock of \$100,000. The incorporators are William A., Arthur A. and Frank S. Rosenberg, who continue the principal owners and active managers.

The Northwest Engineering Works, Green Bay, Wis., which expects to complete its contracts with the Emergency Fleet Corporation on April 15, intends to keep its organization intact and engage in the production of a new design of locomotive crane mounted on the so-called creeper type of tractor truck, with the capacity for handling a $\frac{3}{4}$ -ton or 1-ton clamshell bucket mounted at the end of a 30-ft. or 40-ft. steel boom, and operated by steam or gas engine power.

J. G. D. Mack, chief engineer of the State of Wisconsin, Madison, is taking bids until Feb. 16, at 2 p. m., for the erection of a machine shop, 52x72 ft., for the State Capitol power plant. It will be part two stories and basement and is estimated to cost \$45,000 with equipment.

The Diversey Foundry Co., Chicago, operating two large shops in the vicinity of Chicago, is negotiating with the Chamber of Commerce, Janesville, Wis., for a site for a new foundry.

The H. C. Doman Co., Oshkosh, Wis., sustained an estimated loss of \$10,000 by fire in the cupola building of its gray iron foundry. Repairs are under way. The company makes internal combustion engines and specializes in marine motors.

The J. I. Case Plow Works Co., Racine, Wis., will award contracts soon for a new malleable iron foundry, 150x300 ft., 40 ft. high, with 46,200 sq. ft. of floor space, costing \$110,000; and a new gray iron foundry, 130x360 ft., 38 ft. high, containing 46,800 sq. ft., and costing \$120,000. H. M. Wallis is president.

The Diversified Food Products Co., Milwaukee, which is building a \$1,000,000 plant on the Port Washington Road, near Lake Street, will take bids in about a week for the construction and equipment of a steam generating plant, 80x200 ft. The work is in charge of A. W. Hoffmann, consulting engineer, Third Street and North Avenue.

The P. B. Yates Machine Co., Beloit, Wis., manufacturer of woodworking machinery, has plans for a brick and steel foundry, 150x264 ft., which is estimated to cost \$325,000 with equipment. Bids will be taken in February.

The Star Mfg. Co. of Wausau, Wis., incorporated several months ago with an authorized capital stock of \$1,000,000, to manufacture an automatic milking machine, has perfected its organization by the election of the following officers: President, E. R. Goode, Minneapolis; vice-president, John L. Sell, Wausau; secretary, D. W. McKercher, Grand Rapids, Wis.; treasurer, George W. Hill, Grand Rapids; director, L. H. Cook, Wausau. A stock issue of \$200,000 is being marketed to finance the construction and equipment of a factory in Wausau.

The Oshkosh Motor Truck Co., Oshkosh, Wis., has increased its capital stock from \$500,000 to \$1,500,000 for the purpose of erecting a new manufacturing plant, work on which will begin about March 15. The first building will be 80x310 ft., of brick and steel. Considerable new machine tool and other equipment will be required. William A. Besserlich is president and chief engineer.

The Wisconsin Machinery & Paper Co., Tomahawk, Wis., has been organized by T. E. Mussen, Charles Mussen and William Dreyer to manufacture machinery for producing sandpaper and abrasive fabrics.

R. J. Schwab & Sons Co., 283 Clinton Street, Milwaukee, will build a one-story addition, 48x90 ft., at Park and Reed streets, to replace a building recently destroyed by fire. It manufactures boilers, furnaces and other heating devices.

The International Steel Products Co., Hartford, Wis., at its annual meeting, effected a reorganization of management and decided to enlarge its line of products, heretofore confined to gas engine mufflers or silencers. Some new equipment for sheet metal working and machining processes will be purchased. A. F. Schauer is president and Andrew Martin, secretary.

Frank J. Edwards and George H. Williams of Milwaukee, who have been engaged for several years in manufacturing motor truck attachments for passenger car chassis, as the E. & W. Mfg. Co., 325-335 Oregon Street, have organized two corporations, as follows: E. & W. Co., capital stock, \$125,000, and Frank J. Edwards, Inc., capital stock \$50,000. The articles of both concerns provide privileges of manufacturing motors, motor vehicles, boats, engines, etc.

The Wausau Iron Works, Wausau, Wis., has increased its capital stock from \$50,000 to \$100,000. It operates a foundry and machine shop, and specializes in structural fabrication and erection.

The Cutler-Hammer Mfg. Co., Milwaukee, Wis., is devoting new floor space to the industrial electric heating department, in addition to the space formerly used for manufac-

turing household electric appliances, which have been discontinued. The industrial heating line is being expanded and includes such products as the electric space heater, soldering iron, linotype pot heaters, metal melting pot, chocolate warmers for candy factories, immersion water heater, circulation water heater, tailors' irons, and heater units for application to all types of machinery.

St. Louis

ST. LOUIS, Jan. 26.

The Lafayette Lumber Co., Lafayette, La., is in the market for machinery for the manufacture of cement shingles and blocks.

The Consumers' Ice & Light Co., Magnolia, Ark., W. W. Sorrels president, will equip a \$75,000 electric power and ice making plant.

Lee Brothers, Greenfield, Mo., will rebuild their electric light, water and ice manufacturing plant, recently burned, and are taking bids for about \$20,000 worth of machinery.

The Missouri Pacific Railroad Co., H. R. Carpenter, St. Louis, chief engineer, will equip a roundhouse and machine shop at Lake Charles, La., to cost about \$140,000.

The Missouri, Kansas & Texas Railroad Co., Frederick, Okla., E. L. Martin, chief engineer, Dallas, Tex., will equip a roundhouse and machine shop at Frederick.

The city of Sweetwater, Mo., J. J. Smith, mayor, is in the market for one 200 hp. Diesel or semi-Diesel crude oil engine.

The city of Sallisaw, Okla., Fred E. Johnston, manager, will equip an electric light plant and is in the market for one 150 hp. boiler, one 250 hp. engine, one 250 k.v.a. 60-cycle, alternating current generator and other machinery.

The Richard Carter Co., Gulfport, Miss., capital stock \$1,000,000, A. R. Carter, president, will equip a plant for the manufacture of multiple piston engines.

The Simms Petroleum Co., Homer, La., E. F. Simms, president, will build a pipe line to cost about \$5,000,000, from Homer to New Orleans, with 20,000 bbl. pumping stations about 40 miles apart.

The Dunn Refining Co., Bartlesville, Okla., will equip a pipe line with 2000 bbl. capacity pumping stations. M. E. Burton, Hominy, Okla., is the engineer.

The Fairmont Refining Co., Burton V. Moore, secretary, Enid, Okla., will double the capacity of its plant at Fairmont, Okla. The capital stock has been increased by \$200,000.

The foundry and machine shop to be erected by Heggem & Davis, 624 Kennedy Building, Tulsa, Okla., at Collinsville, Okla., will comprise two structures, each 90 x 100 ft., to cost about \$60,000.

The American Bakers Machinery Co., 2121 North Ninth Street, St. Louis, is planning for the erection of a new plant at Linge Highway and McReo Avenue, to cost about \$100,000.

The King Mfg. Co., St. Joseph, Mo., is planning for the erection of an addition to its plant to be equipped as a foundry, with cost estimated at about \$40,000.

The Cleveland Steel Barrel Co., 1001 West Eighth Street, Kansas City, Mo., is having plans prepared for the erection of two new units, each two stories and basement, 80 x 290 ft., at Rosedale, Kan., to cost about \$200,000.

The Wagner Electric Mfg. Co., 6400 Plymouth Avenue, St. Louis, is taking bids for the superstructure of the proposed addition to its plant, to cost about \$400,000, including equipment. The company specializes in the manufacture of motors.

Texas

AUSTIN, Jan. 24.

The Texas Best Oil & Refining Co., Santa Anna, has purchased 20 acres at that place upon which it will build an oil refinery.

The Craven Oil & Refining Co., Jakehamon, will build a 2,000-bbl. refinery and has purchased a tract of 18 acres, which it will use as a site.

The Gorman Home Refining Co., Gorman, which recently finished building an oil refinery, plans to equip a lubricating plant. W. A. Hickey is superintendent.

The Oklahoma Iron Works, Tampico, Mexico, contemplates enlarging its plant by the installation of additional equipment in its welding shop, wood-working plant, foundry, boiler and blacksmith shops. It also plans to build a floating dry dock of 10,000 tons.

The Elco Pump Co., Waxahachie, has completed arrangements for the enlargement of its plant for the manufacture of visible measuring devices, and is now in the market for the following equipment: One 16-in. x 8 ft. quick change gear lathe with taper attachment, one 16-in.

x 8 ft. quick change gear lathe, one universal milling machine, medium size, one 20-in. stroke shaper, one turret lathe (size undetermined), one 1½-in. automatic screw machine, one radial drill with 30 or 36-in. arm.

The War Department, Washington, has perfected plans for the construction of a fabricated steel hangar at San Antonio, Tex., 125x270 ft., and 100 ft. high, with shop and repair facilities, to cost about \$350,000.

California

LOS ANGELES, Jan. 20.

The Keystone Iron & Steel Works, Vernon, near Los Angeles, has awarded a contract to the Pozzo Construction Co., 421 Macy Street, for a two-story, reinforced-concrete shop, 100 x 367 ft., to form the third or unit "C" of its new iron and steel plant. It will cost about \$84,000 and will be equipped as a machine shop and for other service.

The Twin Harbor Tool Co., Long Beach, Cal., has been incorporated with a capital stock of \$100,000 by Ira A. Church, Ray Meacham and James E. Pawson, Long Beach, to manufacture tools, machine parts, etc.

The Southern California Edison Co., Los Angeles, has arranged for a bond issue of \$7,500,000. It has inaugurated preliminary work on the construction of a large addition to its hydroelectric power plant at Big Creek, to cost in excess of \$3,000,000.

The Neale & Gregg Hardware Co., 107 North Brand Boulevard, Los Angeles, has filed notice of organization to manufacture hardware specialties. C. E. Neale and David L. Gregg, 240 North Central Avenue, Glendale, head the company.

The Ulmer Machinery Co., Porterville, Cal., will build an addition to its plant to cost about \$25,000.

The Gill Piston Ring & Sales Co., 1522 South Grand Avenue, Los Angeles, has filed notice of organization to manufacture piston rings. Charles W. Monahan, Jr., 1324 Bond Street, heads the company.

The International Iron & Steel Co., Los Angeles, has been incorporated with a capital of \$200,000 by W. G. Harris, A. B. Linard and W. H. Durst, to manufacture iron and steel specialties.

The California Highway Commission, San Francisco, will build a new machine shop at Fruitvale for repair work and parts manufacture of road machinery, to cost about \$20,000, exclusive of equipment.

The Llewellyn Iron Works, 1216 North Main Street, Los Angeles, has filed plans for the erection of a one-story shop addition.

The Alexander-Walling Stage Co., Fresno, Cal., has had plans prepared for the erection of a one-story, reinforced-concrete automobile repair works and machine shop, 50 x 140 ft., to cost about \$16,000.

The New Process Foundry Co., 165 South Rio Street, Los Angeles, has filed notice of organization to manufacture castings. William Walsh, 466 East Santa Barbara Avenue, heads the company.

The United States Refractories Co., San Luis Obispo, Cal., recently incorporated with a capital of \$50,000, is planning for the establishment of a local plant for the production of high grade refractory materials. R. W. Hull, Jr., George C. Langley and A. H. Simpson, San Luis Obispo, head the company.

The Pacific Northwest

SEATTLE, Jan. 20.

General business conditions are somewhat affected by the extreme uncertainty of the steel shipbuilding industry. The large number of men who have been released from the shipyards the past month has further complicated the employment problem.

Manufacturing continues active and foundries and repair shops report excellent business. Machinery is in fair demand, although the call for sawmill and logging equipment has not been up to standard.

The Oregon Brass Works, Portland, will install two new electric steel furnaces and a quantity of other equipment at a cost of \$20,000.

The B. C. Fir & Cedar Co., Vancouver, B. C., whose sawmill was recently destroyed by fire, will rebuild, the new mill to have a daily capacity of 80,000 ft.

The Kane Pneumatic Shock Absorber Co., Centralia, Wash., which is building a new factory, will install a 500-kw. power plant.

The Burns Mfg. Co., Portland, recently incorporated with \$20,000 capital stock, will manufacture builders', manufacturers' and mill supplies, engines and machinery.

The Worthy Creek Shingle Co., Everett, Wash., has been incorporated with \$12,000 capital stock by W. W. Wells and William Sheller. It plans the establishment of a mill near Everett.

The Emergency Fleet Corporation will, in the first three months of 1920, expend more than \$1,000,000 in Seattle alterations to Japanese built steel ships, including the conversion of the vessels from coal to oil burners.

The Oregon Pipe Organ Co., Portland, will construct a new two-story factory, 75 x 100 ft., estimated to cost \$35,000.

The Hutchinson Lumber Co., Whitefish, Mont., plans the erection of a sawmill, with a daily capacity of 100,000 ft., to cost \$225,000.

Canada

TORONTO, Jan. 26.

The United Shoe Machinery Co. of Canada, Ltd., Montreal, is building an addition, 60 x 120 ft., four stories. It is the intention to have the plant ready for occupation about April 1.

The Mead-Morrison Mfg. Co., East Boston, Mass., has purchased the plant and business of M. Beatty & Sons, Ltd., Welland, Ont., manufacturer of dredges, hoisting engines, contractors' machinery, etc. It is expected that a Canadian company will be formed to operate the works.

The Magnet Metal & Foundry Co., Ltd., Winnipeg, will make improvements to its plant and extend the field of its operations. It manufactures farmers' hardware and light implements and recently secured exclusive Canadian patent rights on several implements and tools which it will manufacture. Hugh R. Eade is president and associated with him as directors are A. E. Donovan, W. R. Ingram, E. G. Powell, Albert Holland.

The National Acme Co., Montreal, manufacturer of milled screws, nuts, bolts and special parts, has started work on the erection of an addition to its plant which will increase its output by 50 per cent.

Plans are completed and machinery is en route from Great Britain for the erection of a wire rope factory on Granville Island, Vancouver, B. C., for the Britannia Wire Rope Co. The plant is to be built by British capital assisted by Robert Gibson of Vancouver, B. C. Raw materials will be brought from Great Britain.

The Canadian Aladdin Co., a branch of the Aladdin Co., Bay City, Mich., has secured six acres at Peterboro, Ont., where it will erect a plant 100 x 200 ft., at a cost of \$70,000, for the manufacture of ready cut houses, etc. It is to be erected, equipped and in operation by September.

The Chipman Holton Knitting Co., Ltd., St. Mary Street, Hamilton, Ont., is in the market for a small screw lathe, about 6 in. x 4 ft.

The Dominion Atlantic Railway, Kentville, N. S., will erect car shops there. George A. Graham is general manager.

Clarke Brothers, Bear River, N. S., have started work on the erection of a pump factory and are in the market for equipment.

J. G. Gardiner, W. McH. L. Gardiner and George Purkis will erect a foundry at Brockville, Ont., for the manufacture of castings for pulp and paper machinery.

The Listowel Piano Factory, Listowel, Ont., will start work immediately on the erection of an addition to cost \$10,000. E. C. Thornton is manager.

The Canadian Belgo Pulp & Paper Co., Shawinigan Falls, Que., plans additions to its paper mills to cost \$1,000,000. H. Biermans is manager.

P. A. Beique, 516 Transportation Building, Montreal, is in the market for an 8- to 16-ton gasoline or crude oil locomotive, new or second hand, 36-in. gage, preferably geared.

Contracts have been awarded in connection with the erection of a manufacturing building at Brampton, Ont., for the Universal Batteries, Ltd., to cost \$25,000.

The Canada Pole & Shaft Co., Ltd., Merritt, Ont., has changed its name to General Forgings & Stampings, Ltd. This was found advisable owing to the fact that the business of the company has been gradually changing from a pole and shaft and woodworking business to a forging and stamping business. For some time the company has been operating only on automobile forgings and stampings and this line will be followed exclusively from now on.

The Detwiler-Reed Co. of Canada, Ltd., Hamilton, Ont., has been incorporated with a capital stock of \$40,000 by Charles A. Smith, Freeman F. Treleaven and others to manufacture trucks, farm implements, machinery, etc.

Clayton, Neil & Jones, with head office in Montreal, and branch at 152 Bay Street, Toronto, have been formed to manufacture general machinery and make a specialty of marine auxiliary machinery including deck winches, steering

engines, pumps, etc. Mr. Clayton is well known to the ship-building firms in Canada. Mr. Neil, who will look after the manufacturing end, is a practical production engineer, and Mr. Jones is a specialist on pumping machinery.

Jacob Kaufman, Ltd., Kitchener, Ont., is in the market for an 8 or 10 track nailing machine.

Reed & Brown, 63 Esplanade East, Toronto, are in the market for a 5-ton stiff-legged power derrick, about 40-ft. boom.

Clark Metals, Ltd., Toronto, has been incorporated with a capital stock of \$100,000 by Wilbert E. Clark, 263 Wright Avenue; Ernest J. Bloore, Walter H. Kimpton, and others to manufacture castings, machinery, etc.

The Central Foundry, Ltd., Georgetown, Ont., has been incorporated with a capital stock of \$40,000 by Benjamin Luxenberg, 279 Palmerston Avenue; John R. Huffman, Joseph A. Sweet, 33 Richmond Street West and others all of Toronto, to manufacture castings, machinery, implements, etc.

The Schofield Tractor Corporation, Ltd., Toronto, has been incorporated with a capital stock of \$1,000,000 by David I. Grant, Bank of Hamilton Building; Mervil MacDonald, 72 Alexandra Boulevard; Edwin Smily, and others to manufacture tractors, motor vehicles, engines, machinery, etc.

The Republic Motors, Ltd., Toronto, has been incorporated with a capital stock of \$350,000 by Bruce I. Card, 106 Langley Avenue; Harry G. Beemer, 19 Elm Avenue; John W. Payne and others to manufacture motor cars, motors engines etc.

The Chesley Chair Co., Ltd., Chesley, Ont., is in the market for a hydraulic pump for chair back bending press.

The Miramichi Quarry Co., Quarryville, N. B., is in the market for a crude oil engine of about 50 hp., or two engines which will give that power.

The machine shop owned by the McKinney Lumber Co., Woodstock, Ont., was destroyed by fire with a loss of \$25,000. A temporary building will be erected at once and the company is asking for prices on equipment.

The Ivey Storage Batteries, Ltd., Toronto, has been incorporated with a capital stock of \$500,000 by Percy D. Ivey, Alfred J. Salisbury, both of Toronto; Charles H. Ivey and Richard G. Ivey, London, Ont., and others to manufacture storage batteries, electrical machinery, etc.

The Weed Harvester Machine Co., Ltd., Belleville, Ont., has been incorporated with a capital stock of \$50,000 by Ellsworth Masten, James H. Ellsworth Vrooman, Burton Asselstine and others to manufacture agricultural machinery, implements, tools, equipment, etc.

Eli Renaud, Amherstburg, Ont., will build a foundry to cost \$7,000. Prices are asked on machinery and other equipment.

The Anglin-Norcross Co., 65 Victoria Street, Montreal, Que., has the general contract for the erection of an addition to the plant of the Canada Hart Accumulator Co., at St. Johns, Que., to cost \$25,000.

The Wilkins Automatic Regulator Co., Ltd., Toronto, has been incorporated with a capital stock of \$100,000 by Harry J. Macdonald, Fred H. Little, 69 Oriole Road; Thomas A. Morrow and others to manufacture valves, automatic pressure regulators, etc.

The Erie Stove & Mfg. Co. of Canada, Ltd., Montreal, has been incorporated with a capital stock of \$200,000, by Frank B. Common, Francis G. Bush, Herbert W. Jackson, and others to manufacture stoves, furnaces, boilers, heating appliances, machinery, tools, etc.

The John Allen Safe Co., Ltd., Montreal, has been incorporated with a capital stock of \$75,000, by John MacNaughton, Robert Dodd, James A. Rose and others to manufacture safes, vaults, etc.

The Mitchell-Dossert Co., Ltd., Montreal, Que., has been incorporated with a capital stock of \$50,000 by Linton H. Ballantyne, Francis G. Bush, George R. Drennan and others to manufacture electrical equipment, etc.

A building which included a car barn and machine shop owned by the Moncton Tramway, Electric & Gas Co., Moncton, N. B., was destroyed by fire with a loss of \$50,000.

The Christiana Machine Co., Christiana, Pa., has increased its capital stock from \$56,600 to \$58,800. M. F. Shaw, Philadelphia, is treasurer.

Government Purchases

WASHINGTON, Jan. 26.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, for supplies for the naval service as follows: Schedule 5442, 1 universal radial drill for Newport, opening Feb. 3; schedule 5446, 1 cut-off saw machine for Philadelphia, opening Feb. 6; schedule 5448, 1 motor-driven planer for Mare Island, opening Feb. 20.

Industrial Finances

Stockholders of the Collins Co., Collinsville, Conn., have voted to refer back to the directors the proposition to sell the assets of the company to the Simonds Mfg. Co., Fitchburg, Mass. It is claimed that in view of the increasing foreign demand for the company's products its assets are worth more than the Simonds Mfg. Co. offered for them. The directors will act on the matter Feb. 1.

The Newton Steel Co., whose plant at Newton Falls, Trumbull county, Ohio, is expected to begin the production of sheet steel early in March, is offering \$650,000 of a total authorized amount of \$1,000,000 7 per cent cumulative preferred stock. In addition to the amount now offered \$55,000 was subscribed in advance of the offering, making the total issue of preferred at this time \$705,000 and leaving \$295,000 in the treasury for future requirements. The authorized common stock of the company is \$2,000,000, of which \$1,350,000 has been issued. The cost of the plant represents approximately the common stock. The preferred stock now being offered will be used as working capital.

President Robert Bentley of the Ohio Iron & Steel Co., Youngstown, Ohio, a holding company, announces that directors have authorized the regular dividend of one per cent a month and an extra of one per month, for 1920, payable at the rate of 2 per cent the first of each month. The company has \$2,100,000 common stock outstanding which will participate. The Ohio Iron & Steel Co. owns securities in leading district corporations. Formerly and for many years it operated Mary blast furnace at Lowellville, Ohio, which was acquired several years ago by the Sharon Steel Hoop Co.

The Harvey Steel Products Co., operating a plant at Jackson, Tenn., has been reorganized and incorporated under the laws of Ohio and is issuing \$1,000,000 in new preferred stock. C. A. Irwin, H. S. Renkert and W. W. Irwin, who have been identified with the sheet steel industry in Canton, Ohio, have become affiliated with the company and are vice-presidents. W. J. Harvey is president and W. H. Eason is secretary and treasurer. The company is engaged in the manufacture of oil, gas and steam engines, portable and stationary boilers, saw mill machinery, etc.

Framingham Foundries, Inc., Framingham, Mass., has issued \$60,000 new stock. Noble Foss is president of the corporation and W. Emerson Barrett, treasurer.

The corporate name of the National Textile Finishing Co., organized under Massachusetts laws, has been changed to the Textile Co., Inc. Samuel Aronson is president, and Philip Glazer is treasurer.

The offering of McCord Mfg. Co., Inc., Chicago, stock to stockholders, on a one for one basis at \$42.50 per share, was successful. Payment for the new stock must be made on or before Feb. 2.

The Worcester Wire Works, Inc., a Massachusetts corporation, has increased its capitalization by an issue of \$90,000 preferred stock having a par value of \$100 per share. There is now outstanding 600 shares of common and 900 of preferred stock. Charles O. Johnson is president of the company.

The stockholders of the Greenfield Tap & Die Corporation, Greenfield, Mass., have authorized a reduction in the par value of the common stock from \$100 to \$25, and an issue of \$3,500,000 of additional stock. Of the new stock, \$500,000 will be issued at this time, bringing the total amount outstanding up to \$2,000,000.

The Globe Phone Mfg. Co., Reading, has been incorporated under Massachusetts laws to acquire the business of the Globe Ear-Phone Co., Reading, manufacturer of ear phones, dictagraphs, telephones, telegraph instruments, etc. The Reading plant occupies about 13,737 sq. ft. The new company is capitalized for \$300,000, divided into 4000 shares of common stock, par \$50, and 1000 shares of 7 per cent preferred, par \$100. Albert G. Barker, North Reading, is president; Fred E. Bronson, Reading, treasurer; and M. Sumner Coggan, Malden, clerk. Messrs. Barker and Bronson and Walter C. Mooney, Reading, constitute the board of directors.

Current Metal Prices

On Small Lots, from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

Iron and Soft Steel Bars and Shapes

Bars:	Per lb.
Refined iron, base price.....	4.25c.
Swedish bars, base price.....	20.00c.

Soft Steel:

$\frac{3}{4}$ to 1 $\frac{1}{2}$ in., round and square.....	3.52c. to 4.00c.
1 to 6 in. x $\frac{3}{8}$ to 1 in.....	3.52c. to 4.00c.
1 to 6 in. x $\frac{1}{4}$ to 5/16.....	3.62c. to 4.00c.
Rods— $\frac{3}{8}$ and 11/16.....	3.57c. to 4.05c.
Bands—1 $\frac{1}{2}$ to 6 by 3/16 to No. 8.....	4.22c. to 4.75c.
Hoops	4.47c. to 5.50c.

Shapes:

Beams and char-nels—3 to 15 in.....	3.47c. to 3.90c.
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Angles:

3 in. x $\frac{1}{4}$ in. and larger.....	3.47c. to 3.90c.
3 in. x 3/16 in. and $\frac{1}{2}$ in.....	3.72c. to 4.25c.
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ in. x $\frac{1}{4}$ in.....	3.52c. to 4.05c.
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ in. x 3/16 in. and thicker.....	3.47c. to 4.00c.
1 to 1 $\frac{1}{4}$ in. x 3/16 in.....	3.52c. to 4.45c.
1 to 1 $\frac{1}{4}$ x $\frac{1}{2}$ in.....	3.57c. to 4.50c.
$\frac{7}{8}$ x $\frac{7}{8}$ x $\frac{1}{2}$ in.....	3.62c. to 4.60c.
$\frac{3}{4}$ x $\frac{1}{2}$ in.....	3.67c. to 4.65c.
$\frac{3}{4}$ x $\frac{1}{2}$ in.....	4.07c. to 5.00c.
$\frac{1}{2}$ x 3/32 in.....	5.17c. to 5.70c.

Tees:

1 x $\frac{1}{2}$ in.....	3.87c. to 4.75c.
1 $\frac{1}{4}$ in. x 1 $\frac{1}{4}$ x 3/16 in.....	3.77c. to 4.50c.
1 $\frac{1}{2}$ to 2 $\frac{1}{2}$ x 3/16 in. and thicker.....	3.57c. to 4.10c.
3 in. and larger.....	3.52c. to 3.95c.

Merchant Steel

	Per lb.
Tire, 1 $\frac{1}{2}$ x $\frac{1}{2}$ in. and larger.....	3.52c. to 4.00c.
Toe calk, $\frac{1}{2}$ x $\frac{3}{8}$ in. and larger.....	4.85c.
Open-hearth spring steel	7.00c.
Standard cast steel, base price.....	14.00c.
Extra cast steel	18.00 to 20.00c.
Special cast steel	23.00 to 25.00c.

Tank Plates—Steel

	Per lb.
$\frac{1}{4}$ in. and heavier.....	3.67c. to 4.25c.

Sheets

Blue Annealed

	Per lb.
No. 10	5.07c. to 5.80c.
No. 12	5.12c. to 5.85c.
No. 14	5.17c. to 5.90c.
No. 16	5.27c. to 6.00c.

Box Annealed—Black

	Soft Steel C. R., One Pass, per lb.	Wood's Refined, per lb.
Nos. 18 to 20.....	6.30c. to 6.80c.	
Nos. 22 and 24.....	6.35c. to 6.85c.	7.80c.
No. 26	6.40c. to 6.90c.	7.85c.
No. 28	6.50c. to 7.00c.	8.00c.
No. 30	6.60c. to 7.20c.	
No. 28, 36 in. wide, 10c. higher.		

Galvanized

	Per lb.
No. 14	6.75c. to 8.50c.
No. 16	7.00c. to 8.75c.
Nos. 18 and 20	7.15c. to 8.90c.
Nos. 22 and 24	7.30c. to 9.05c.
No. 26	7.45c. to 9.20c.
No. 27	7.60c. to 9.35c.
No. 28	7.75c. to 9.50c.
No. 30	8.25c. to 10.00c.
No. 28, 36 in. wide, 20c. higher.	

Standard—Steel

	Blk.	Galv.		Blk.	Galv.
$\frac{1}{2}$ in. Butt... —36	—19		$\frac{3}{4}$ -1 $\frac{1}{2}$ in. Butt... —18	+2	
$\frac{3}{4}$ -3 in. Butt... —40	—24		2 in. Lap..... —9	+5	
3 $\frac{1}{2}$ -6 in. Lap... —35	—20		2 $\frac{1}{2}$ -6 in. Lap.. —11	+6	
7-12 in. Lap.. —25	—8		7-12 in. Lap... +1	+19	

Pipe

Wrought Iron

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general headings of "Iron and Steel Markets" and "Metal Markets."

Steel Wire

BASE PRICE* ON NO. 9 GAGE AND COARSER

	Per lb.
Bright basic	7.50c.
Annealed soft	7.50c.
Galvanized annealed	8.00c.
Coppered basic	8.00c.
Tinned soft Bessemer.....	9.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High Brass Sheet.....	28 $\frac{1}{4}$ c. to 29 $\frac{1}{2}$ c.
High Brass Wire.....	28 $\frac{1}{4}$ c. to 29 $\frac{1}{2}$ c.
Brass Rod	26 $\frac{1}{4}$ c. to 29 c.
Brass Tube	42 $\frac{1}{2}$ c. to 44 $\frac{1}{2}$ c.

Copper Sheets

Sheet copper, hot rolled, 16 oz., 29 $\frac{1}{2}$ c. per lb. base.
Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade	Grade	Coke—14x20	Primes	Wasters
	"AAA"	"A"	80 lb....	\$9.30	\$9.05
	Charcoal	Charcoal	90 lb....	9.40	9.15
	14x20	14x20	100 lb....	9.50	9.25
IC...	\$15.00	\$13.00	IC...	9.75	9.50
IX...	17.25	15.00	IX...	10.75	10.50
IXX...	19.00	16.75	IXX...	11.75	11.50
IXXX...	20.75	18.50	IXXX...	12.75	12.50
IXXXX...	22.25	20.25	IXXXX...	13.75	13.50

Terne Plates

8-lb Coating 14x20	
100 lb.	\$9.35
IC	9.50
IX	10.50
Fire door stock.....	12.75

Tin

Straits pig	66c.
Bar	70c. to 75c.

Copper

Lake ingot	21c. to 22c.
Electrolytic	20c. to 21c.
Casting	19 $\frac{1}{2}$ c. to 20c.

Spelter and Sheet Zinc

Western spelter	10 $\frac{1}{2}$ c. to 11 $\frac{1}{2}$ c.
Sheet zinc, No. 9 base, casks.....	13 $\frac{1}{2}$ c. open 14c.

Lead and Solder*

American pig lead	9 $\frac{1}{2}$ c. to 10 $\frac{1}{2}$ c.
Bar lead	10 $\frac{1}{2}$ c. to 11 c.
Solder $\frac{1}{2}$ and $\frac{1}{2}$ guaranteed.....	43c.
No. 1 solder.....	40c.
Refined solder	36c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.....	90c.
Commercial grade, per lb.....	50c.

Antimony

Asiatic	12c. to 13c.
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Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....	35c. to 38c.
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Old Metals

The market is quiet. Dealers' buying prices are nominally as follows:

	Cents Per lb.
Copper, heavy and crucible.....	17.50
Copper, heavy and wire.....	16.50
Copper, light and bottoms	15.00
Brass, heavy	11.00
Brass, light	8.00
Heavy machine composition.....	16.25
No. 1 yellow rod brass turnings.....	10.00
No. 1 red brass or composition turnings.....	13.00
Lead, heavy	7.00
Lead, tea	4.75
Zinc	5.50

